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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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COMMERCIAL FISHERIES REVIEW

June 1965 Washington, D.C. Vol. 27, No. 6

AN EXPERIMENT IN ELECTRICAL FISHING WITH AN ELECTRIC FIELD USED AS AN ADJUNCT TO AN OTTER-TRAWL NET

By Ernest D. McRae, Jr.* and Leon E. French, Jr.**

SUMMARY

Electrical fishing is not a new fishing method; however, problems with application in a marine environment have limited its successful use to date. As part of cooperative research with the Smith Research and Development Company (SRD), the U. S. Bureau of Commercial Fisheries test-fished electical fishing equipment (developed by SRD) which was designed to overcome these problems.

The tests were conducted on New England commercial fishing grounds and used an electric field as an adjunct to an otter trawl (net) of commercial design. To determine the fishing effectiveness of the electric field, a comparative method of towing was employed. This consisted of a series of as nearly identical tows as possible with the electric field used on alternate tows.

The test results indicate that for overall fishing, the net with the electric field fished over 2.3 times as effective as the net alone. The fishing effectiveness of the net with the electric field was 1.5 times that of the net alone for taking cod and haddock. For flatfish, the net with the electric field was twice as effective as the net without the field. The catch rate for taking whiting with use of the electric field was 4.4 times the catch rate of the net alone.

Plans for future work include specific testing to determine the answers to some of the questions unresolved by these tests.

Fig. 1 - The Bureau of Commercial Fisheries' vessel Delaware operated by the Exploratory Fishing and Gear Research Base, Gloucester, Mass.

INTRODUCTION

Efforts to catch fish by means of an electric current, used independently or combined with accessory gear, have been fairly common since the 1930's. Such efforts and the hopes of the various investigators of electrofishing methods have been based upon two types of reaction of fish to d.c. electric currents. These reactions have been termed electrotaxis: the guiding and stimulation of swimming activity by means of electricity, and electronarcosis: the stunning of the fish for electrical shock.

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If the proper form of electrical current is passed through a body of water containing fish, a remarkable change in the normal behavior pattern can be observed: the fish turn in the direction of the positive electrode (the anode) and swim toward it. They will continue in this manner until they arrive within a certain proximity of the anode where, dependent upon the species of fish, the size of the individual, and the intensity of the electrical current, they become immobilized, turn on their backs or sides, and remain in this stunned state until the electric power is turned off. After a recovery period, the fish can be induced to reverse their direction and swim to the opposite electrode by changing the polarity of the electrodes.

Upon observing this reaction, one is inclined to visualize an installation of generators or batteries with wires and electrodes placed in appropriate bodies of water, continuously gathering in quantities of fish which can be removed by a simple mechanical means such as a dip net, seine, conveyor, or other device.

This has, indeed, been demonstrated to be an effective means of catching fish in fresh water. Many state conservation agencies collect game fish species for biological studies using simple battery-powered back-pack shockers or portable generators. (Use by private citizens for collection of fresh-water species is generally prohibited by law.) Successful application in fresh water, however, has not been easily duplicated in sea water. Perhaps the most important factor which has limited the successful use of an electric field in marine waters is the electrical conductivity of the sea water; as the salinity increases, so does the ionic concentration and the resulting electrical conductivity of the water.

Earlier investigators of marine electrical fishing have determined that the conductivity of sea water is approximately 500 times greater than the average body of fresh water (Meyer-Warden 1957). Because of this, the use of simple a.c. or continuous d.c. electric power is impractical for marine electrofishing. According to such investigations, it would be necessary to produce up to approximately 10,000 kilowatts (10 million watts) of electric power to attain an electrical fishing range (spherical radius from an electrode) of 10 meters (32.8 feet).

The search for a solution to astronomical power requirements has led, through extensive research by physicists, biologists, and engineers in various countries over the past 20 years, to the general use of one or another form of condenser discharge pulses, or bursts of electrical power applied at intervals. A major advantage of this type of discharge is that a bank of condensers can be charged over a relatively long period of time, for example, 20 milliseconds, and discharged in a short period, one millisecond or less. Such an arrangement effects a great conservation of electrical power (Kreutzer 1963) and, to the encouragement of research efforts, has been determined to be extremely effective in guiding and stunning most species of fresh- and salt-water fish. The experiment reported here was conducted with a particularly effective modification of such high-power condenser-discharge pulses.

The major problems in the marine application of an electric field to groundfish fishing are (1) to supply the electric current required to produce the desired effect upon the fish, (2) to transform the current into the most efficient and effective form and type to catch fish, (3) to transport this current from the ship to the net (where it will be used) without exorbitant loss, (4) to overcome or eliminate the effect of electrolysis upon the electrodes, and (5) to provide rugged and practical equipment components necessary to withstand use aboard ship and severe treatment during fishing operations.

With the exception of item (1) above, the solution to each major problem depends upon the successful resolution of a number of other directly or collaterally associated problems. Many of these are highly technical in nature and require specialized knowledge and training in fields which are frequently distinct and dissociated. Mainly for this reason, progress to date has been limited. However, successful electric harpoons and hooks, which shock large fish or mammals into submission, have been developed and used (Houston 1949) and, in the menhaden fishery, the "attracting effect" (electrotaxis) of an electric field is currently being used in conjunction with pumps as a means for transferring net-caught fish from the sea to ships' holds. Also, electrical currents have recently been successfully tested and experimentally

used in fishing for shrimp in the Gulf of Mexico (Wathne 1963); plans for commercial application are now being expedited. These, and perhaps other illustrations, can be cited as examples of present use of this fishing method in the sea; but extended work is still required before commercial-scale employment of the electrical fishing method in the groundfish fishery can be achieved.

The purpose of this paper is to report on one segment of continuing research which has had successful results. Efforts were made to guide bottom-dwelling fish toward the opening of an otter-trawl being towed across the sea bottom in the usual manner and to shock them sufficiently upon their arrival at the net so that they would be immobilized and swept easily into the body of the trawl. The equipment was thus designed to prevent escapement of the fish within the path of the trawl and to eliminate the possibility of any of the fish swimming back out of the mouth of the net once they had been engulfed by it. The electrical equipment[1/] used was developed by the Smith Research and Development Company of Lewes, Del.

EXPERIMENT

Fishing trials were conducted over portions of commercial fishing banks which are fished seasonally by New England trawlers for groundfish. The depths fished ranged from 47 to 58 fathoms, most of the tows being made in depths between 50 and 56 fathoms. The transport of current was over a 300-fathom length of conductor-towing warp which was payed out as needed from a trawl winch. (The entire 300 fathoms remained in the electrical circuit at all times regardless of what portion of the warp was run off the winch into the water).

The tests were conducted from July 11 to August 24, 1962, by staff members of the Bureau's Exploratory Fishing and Gear Research Base, Gloucester, Mass., using the exploratory fishing vessel Delaware (fig. 1). Representatives of the Smith Research and Development Company installed their equipment and operated it during most of the cruise.

FISHING AREAS: The areas in which the tests were conducted (fig. 2) were chosen because of (1) their good trawlable bottom (a necessity for avoiding possible damage to, or loss of, the electrical components on the net), and (2) their close proximity to each other (in the event it became necessary, in order to maintain suitable catches of fish, to shift fishing areas during the tests). The primary fishing area chosen lies offshore from Cape Cod in the general area between Nauset Harbor and Chatham, Mass., in approximately 49 to 58 fathoms of water (long. 69°42.5' W., lat. 41°43.5' N.; to long. 69°48.5' W., lat. 41°47.7' N.). The secondary fishing area chosen lies on the western side of Georges Bank in a region known as the "Bight of Clarks" (long. 68°33.2' W., lat. 41°27.5' N.; to long. 68°30' W., lat. 41°32.5' N.). The fishing tests were made in two parts: during the first part, all fishing was in the Cape Cod area; during the second part, fishing was conducted in both the Cape Cod and Bight of Clarks areas.

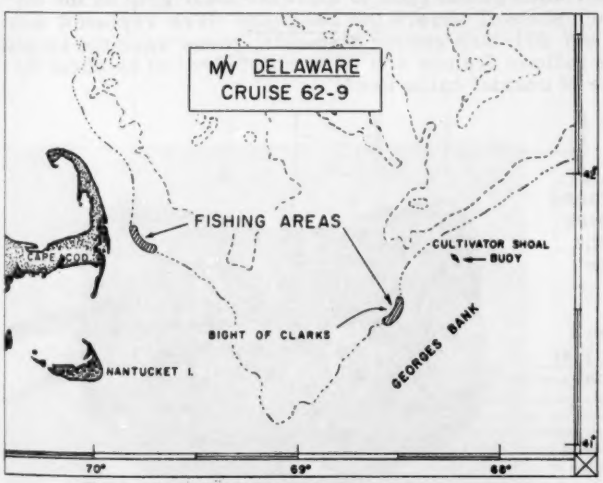

Fig. 2 - Areas fished during electrical-fishing experiments.

FISHING GEAR: A No. 41 large-mesh otter trawl was used during the experiments. This net had a 79-foot headrope and a 100-foot footrope. It was rigged with three 15-foot sections of 16-inch diameter wooden rollers on the footrope, 5-fathom wire legs, and 30 floats on the headrope; the floats were cast aluminum

1/Details of the electrical equipment are included in a separate appendix attached to the reprint of this article.

with 7.5 pounds of static lift for each. The internal stretched mesh size of the netting measured 4.5 inches. The net was constructed of multifilament polypropylene twine. Accessory ropes were either polypropylene or nylon. Trawl warps were $1\frac{1}{16}$-inch diameter conductor-cable (fig. 3).

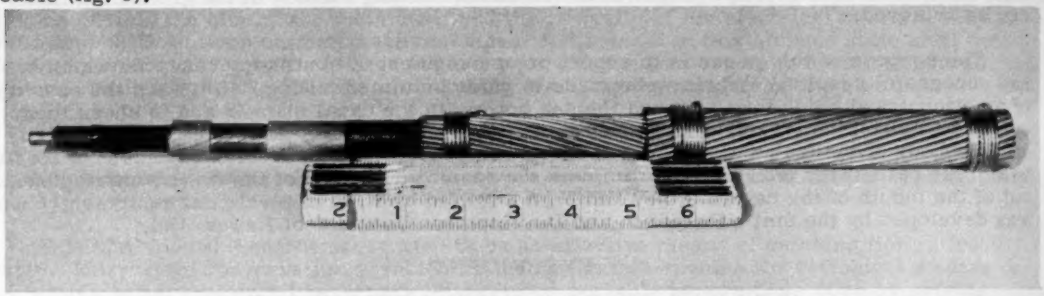

Fig. 3 - Construction details of special electrical-conductor trawl cable.

The conductor cable is made of two distinct parts: (a) strength members, and (b) electrical conductors. Two outer layers of single-strand steel wires provide tensile strength in this cable; to reduce kinking, one layer is left-lay while the other is right-lay. Two No. 4 (American Wire Gage) unplated copper conductors were arranged coaxially and, with their insulating material, formed the core of the cable. Disconnect plugs made the electrical connections at the winch drums; conduit-housed wires conducted the current from its source to these plugs.

Special accessory gear were (1) patented cable grips to attach the linkage for the trawl-door hook-up towing chain to the towing warp without making a break in the electrical conductors, and (2) sheaves of especially large diameter required by the large size electrical conductor trawl warp. The cable grips were the type that wrap around the cable upon which they are mounted (the towing warp) and contract when pulled upon to increase their grip as the tension is increased. The normal 16-inch sheaves aboard the Delaware were replaced with sheaves of 25-inch outside diameter and $20\frac{1}{2}$-inch groove diameter; these were the largest size that could be accommodated by the gallows frames and were considered to be about the smallest practical diameter for the size of coaxial cable used.

PROCEDURE

The fishing tests were conducted in two parts; during both parts the net transformers or cable-output transformers (fig. 4) were shackled to the footrope of the net and the cathodes were laced to the netting in the after part of the bottom belly.

The first part of the fishing tests were made with the anodes laced to the netting just behind the footrope and positioned around the transformers (fig. 5).

The second part of the tests was made with the anodes positioned just behind the headrope of the net. While the anodes were positioned at the headrope, that portion of the electrical field which is formed about the anodes was spread between the electrodes at the headrope and the transform-

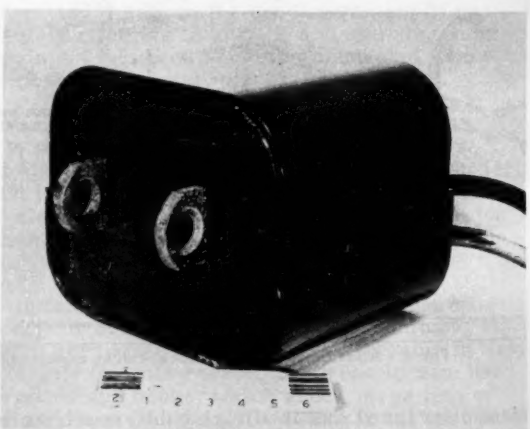

Fig. 4 - Unattached net transformer (cable-output transformer).

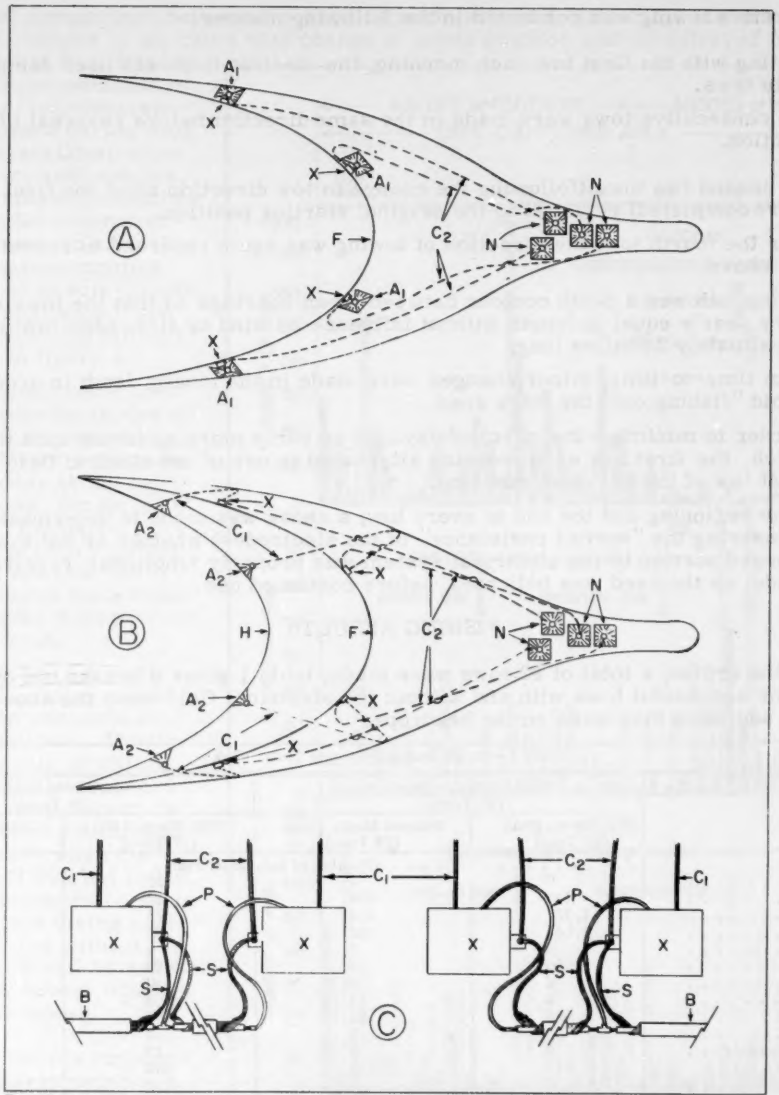

Fig. 5 - Electrical arrangement on net. (A) Transformers and anodes at net footrope. (B) Anodes at net headrope, transformers at footrope. (C) Hook-up arrangement of net transformers. Key: F=footrope; H=headrope; X=transformers; A_1=anode positioned near footrope; A_2=anode positioned near headrope; N=cathode; P=high-voltage conductor to transformer primary; S=shield (common return from transformer primary and secondary); C_1=conductor from transformer secondary to anode; C_2=conductor from transformer secondary to cathode; B=conductor for high-voltage current from shipboard power source.

ers at the footrope, the aluminum housings of which also acted as anodes. Whatever the effect anode separation may have had upon the shape of the electric field, the undetermined effect of this modification should not be overlooked when examining the catch results for the influence of anode position upon the catch.

Comparative towing was conducted in the following manner:

1. Starting with the first tow each morning, the electric field was used during alternate tows.
2. Two consecutive tows were made in the same direction before reversal of tow direction.
3. The second two tows (following the change in tow direction after the first two tows were completed) returned to the original starting position.
4. After the fourth tow, the direction of towing was again reversed to repeat (2) and (3) above.
5. Towing followed a depth contour between loran bearings so that the tows were very nearly equal in length without influence by wind or tide; each tow was approximately 2¾ miles long.
6. From time-to-time, minor changes were made in the towing depth in order to avoid "fishing out" the work area.
7. In order to minimize the effect of daylight or early morning hours upon the total catch, the first tow each morning alternated in use of the electric field with the first tow of the previous morning.
8. At the beginning and the end of every tow, a check was made to determine (through measuring the "spread resistance" of the electrodes) whether or not the submerged portion of the electrical system was properly functional; repairs were made, as the need was indicated, before continued use.

FISHING RESULTS

During the cruise, a total of 82 tows were made; table 1 gives a breakdown of the catch by species for successful tows with and without the electrical field when the anodes were on the footrope and when they were on the headrope.

Table 1 - Catch During Delaware Cruise 62-9

Species	With Anodes on Footrope (45 Tows)		With Anodes on Headrope (36 Tows)	
	With Elect. Field (22 Tows)	Without Elect. Field (23 Tows)	With Elect. Field (17 Tows)	Without Elect. Field (19 Tows)
	(Number of Individual Fish)			
Butterfish	0	0	127	86
Cod	116	108	33	28
Haddock	1,127	874	476	244
Red hake	1,063	137	235	54
White hake	4	7	4	2
Herring	180	6	80	14
Ocean perch	2	0	0	3
Pollock	9	12	3	1
Whiting	394	52	456	148
Wolffish	1	5	0	1
Blackback or lemon sole	3	2	13	7
Dab	918	515	453	410
Four-spot	0	0	0	1
Grey sole	565	208	408	86
Yellowtail	17	5	9	12
Lumpfish	0	0	1	1
Monkfish	119	32	117	52
Ocean pout	67	27	7	2
Sea Raven	44	69	38	42
Rockling, four-bearded	0	0	1	0
Sculpin	23	13	36	11
Shad	6	2	1	1
Dogfish	190	195	9	18
Skate	55	65	195	110
Crab	0	0	1	1
Lobster	3	0	1	0
Scallop	0	0	88	55
Shrimp	0	0	0	6
Squid	747	360	540	678

A visual comparison between the catches made with and without the electric field, as well as possible changes in the catch with change of anode position and the effect of fishing areas upon the catch is facilitated by the graphic representation of the catches of individual species of fish made during each tow. A separate illustration is required for each species. Block diagrams of the catches of three species of commercial importance, specifically haddock (Melanogrammus aeglefinus), gray sole (Glyptocephalus cynoglossus), and whiting (Merluccius bilinearis), appear in figure 6.

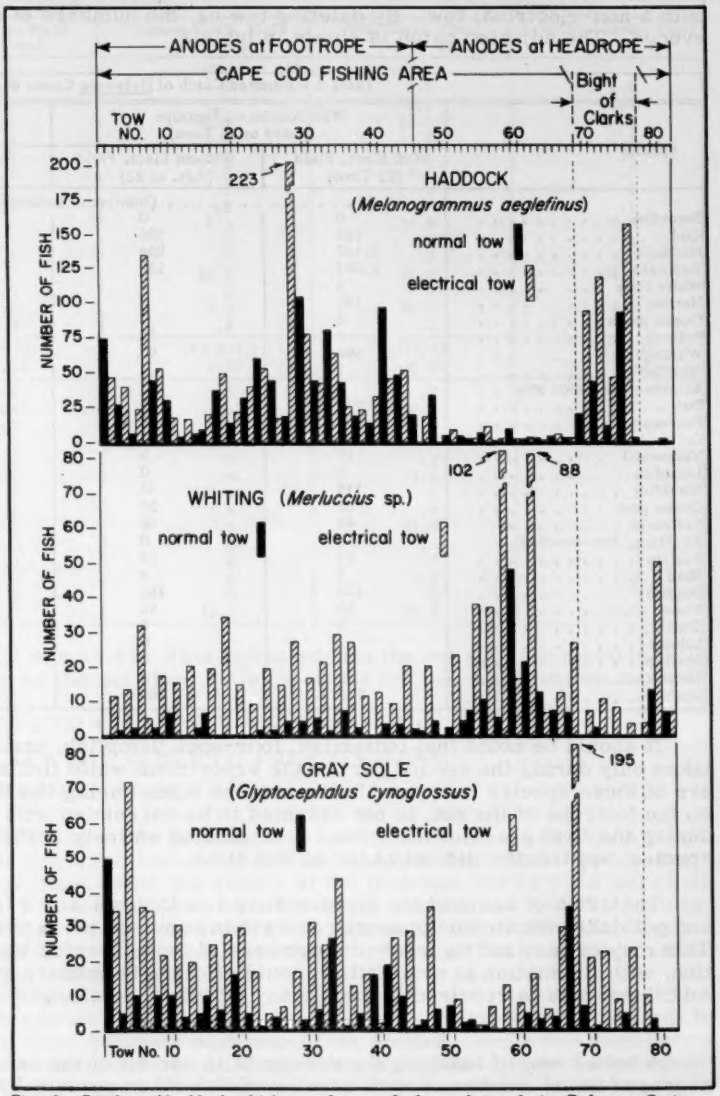

Fig. 6 - Catches of haddock, whiting, and gray sole for each tow during Delaware Cruise 62-9.

Tows numbered 1 to 45 were made with the anodes at the footrope; the remaining tows (46 to 82) were all made with the anodes at the headrope. All tows, except numbers 69 to 77 inclusive, were made in the primary fishing area off of Cape Cod; the excepted tows were made at the Bight of Clarks in the secondary fishing area.

Whiting are normally fished with smaller mesh nets than the one used during the experiment. The increased number of whiting taken with the electric field (fig. 6) may have, in part, reflected escapement through the large mesh when the electric field was not in use. Additional comparative tests on this species (using a whiting net with and without the electric field) will be necessary before further conclusions can be drawn.

Due to the uneven number of comparative tows, a visual comparison of catch results is difficult. To facilitate a direct comparison, adjustments to the data can be made so that (1) the number of comparative tows (with and without the electric field) is equal, and (2) the catches resulting from the deleted tows are also subtracted from the total catch. Three tows are suitable for this adjustment: tow number 45 was the last tow completed on a day during which an odd number of tows was made; towing was begun and ended this day with non-electric tows. By deleting the last tow, the numbers of electrical and non-electrical tows is evened. Tow number 49 was an electrical tow which was not completed due to electrical difficulties. The

comparative non-electrical tow (No. 48) is correspondingly deleted. Tow number 52 (like tow number 45) was an extra non-electrical tow completed at the end of a day which had begun with a non-electrical tow. By deleting tow 52, the numbers of comparative tows is again evened. The adjusted catch is shown in table 2.

Table 2 - Adjusted Catch of Delaware Cruise 62-9

Species	With Anodes on Footrope (Adjusted to 44 Tows)		With Anodes on Headrope (Adjusted to 34 Tows)	
	With Elect. Field (22 Tows)	Without Elect. Field (Adj. to 22)	With Elect. Field (17 Tows)	Without Elect. Field (Adj. to 17)
	(Number of Individual Fish)			
Butterfish	0	0	127	86
Cod	116	105	33	23
Haddock	1,127	854	476	206
Red hake	1,063	132	235	49
White hake	4	7	4	2
Herring	180	6	80	14
Ocean perch	2	0	0	2
Pollock	9	12	3	1
Whiting	394	50	456	140
Wolffish	1	4	0	1
Blackback or lemon sole	3	2	13	7
Dab	918	500	453	361
Four-spot	0	0	0	1
Gray sole	565	207	408	78
Yellowtail	17	5	9	10
Lumpfish	0	0	1	1
Monkfish	119	32	117	49
Ocean pout	67	27	7	2
Sea raven	44	60	38	35
Rockling, four-bearded	0	0	1	0
Sculpin	23	13	36	10
Shad	6	2	1	1
Dogfish	190	189	9	18
Skate	55	52	195	108
Crab	0	0	1	1
Lobster	3	0	1	0
Scallop	0	0	88	55
Shrimp	0	0	0	6
Squid	747	360	540	450

It should be noted that butterfish, four-spot, lumpfish, crab, shrimp, and scallop were taken only during the second part of the experiment while fishing at the Bight of Clarks. Failure of those species to appear in the catches taken during the first part, when the anodes were on the footrope of the net, is not assumed to be correlated with the electrode position; fishing during the first phase of the tests was conducted entirely in the Cape Cod area where those species, apparently, did not occur at that time.

The catch of some of the species shown on tables 1 and 2 (notably white hake, ocean perch, and pollock) indicate an apparent reversal in numbers taken with the change of anode position. This may or may not be true--the numbers of those species were small and sampling variation, with fluctuation in availability, could effectively obscure the expression of a valid trend. Additional data is required to clarify any effect of the changed anode position upon the catch of these species of fish.

A better way of handling the results is to use all of the catch data and to determine the average (mean) number of each species of fish taken per tow by each method. By separating the catches made while the anodes were in different positions, it is possible to discern the effect, if any, of anode position upon the catch. Table 3 shows the mean number of fish taken per tow during the comparison tows; the two positions of the anodes and the resulting catch rates are also indicated.

To evaluate the fishing effectiveness of the electric field, as compared to the net without the field, a comparison is made between the catches which were taken by each method. From the data given in table 3, a weighted averaged of 4.80 fish (for each of the 15 commercial species listed) was taken per tow without using the electric field. The comparable average for

Table 3 - Mean Number of Individual Fish of Each Species Taken Per Tow During Electrical and Nonelectrical Comparative Fishing

Species	Anodes on Footrope		Anodes on Headrope	
	With Elect. Field (22 Tows)	Without Elect. Field (23 Tows)	With Elect. Field (17 Tows)	Without Elect. Field (19 Tows)
	(Number of Individual Fish)			
Butterfish	0	0	7.5	4.5
Cod	5.3	4.7	1.9	1.5
Haddock	51.2	38.0	28.0	12.8
Red hake	48.3	6.0	13.8	2.8
White hake	.2	.3	.2	.1
Herring	8.2	.3	4.7	.7
Ocean perch	.1	0	0	.2
Pollock	.4	.5	.2	.1
Whiting	17.9	2.3	26.8	7.8
Wolffish	.1	.2	0	.1
Blackback or lemon sole	.1	.1	.8	.4
Dab	41.7	22.4	26.6	21.6
Four-spot	0	0	0	.1
Gray sole	25.7	9.0	24.0	4.5
Yellowtail	.8	.2	.5	.6
Mean (of the means) for commercial species above	(200/15) 13.33	(83.8/15) 5.59	(135/15) 9.00	(57.8/15) 3.85
Lumpfish	0	0	.1	.1
Monkfish	5.4	1.4	6.9	2.7
Ocean pout	3.0	1.2	.4	.1
Sea raven	2.0	3.0	2.2	2.2
Rockling, four-bearded	0	0	.1	0
Sculpin	1.0	.6	2.1	.6
Shad	.3	.1	.1	.1
Dogfish	8.6	8.5	.5	.9
Skate	2.5	2.8	11.5	5.8
Crab	0	0	.1	.1
Lobster	.1	0	.1	0
Scallop	0	0	5.2	2.9
Shrimp	0	0	0	.3
Squid	34.0	15.7	31.8	35.7

fish taken with the electric field was 11.44. This indicated that the net with the electric field fished 2.38 times as effectively as the net alone. Calculations for the values shown were:

a. (5.59 x 23) + (3.85 x 19) / 23 + 19 = 4.80;

b. (13.33 x 22) + (9.00 x 17) / 22 + 17 = 11.44;

c. 11.44 / 4.80 = 2.38.

To determine the effect which the anode position may have had upon the catches, a comparison is made between the fishing effectiveness of the net with the electric field while the anodes were at the different positions. With the anodes at the footrope, the catches were 2.39 times the nonelectric catches. With the anodes at the headrope, the catches were 2.34 times the nonelectric catches. The difference between those two values is 0.05 or less than 2 percent of either value. This small difference is not considered to be significant as other variables could have introduced larger differences.

Based upon the above, conclusions might be drawn that, for overall catches of fish, no significant differences resulted from different positions of the anodes. While this may be true for overall catches, conclusions should not be drawn concerning the effect of anode position upon the catch of individual species of fish where species behavior and level of susceptibility to pulse frequency, pulse shape, or to the strength of the field may determine a real difference in catch levels with the change of anode position. Adequately programmed research in the future would include (1) experimentation with electrode position for a determination of optimum position for species effect, (2) levels of species susceptibility, and (3) optimum pulse shape and frequency for influencing commercially desirable size fish.

Otter-trawling is the fishing method most used in New England waters for taking groundfish. For this reason, the data on cod (Gadus callarias) and haddock (Melanogrammus aeglefinus) are considered separately. When the data for those two species are grouped, about 1.5

times as many fish of those species were taken when the electric field was in use as were caught by the net without the field.

However, this method of consolidating the data tends to obscure a difference between catches made with the anodes in different positions. While the anodes were at the footrope, the mean electric catch rate was about 1⅓ times (1.32) the nonelectric catch rate; but when the anodes were at the headrope, the electric catch rate was slightly more than double (2.09) the nonelectric catch rate. The difference between 2.09 and 1.32 is 0.77; this is 36.8 percent of the former and 58.3 percent of the latter value. There is a significant difference here which will be considered during future work.

For analysis of the effect that might be expected in the flatfish fishery, the data for lemon sole and blackback (Pseudopleuronectes americanus), dab (Hippoglossoides platessoides), gray sole (Glyptocephalus cynoglossus), and yellowtail (Limanda ferruginea) were grouped. By grouping in this manner, it can be seen that the catch rate with the electric field was more than twice (2.04 times) as effective for those species as the catch rate made by the net without the field. In comparing the difference in fishing effectiveness with changes in anode position, the electric catch rate was 2.1 times the nonelectric catch rate when the anodes were on the footrope and 2.39 times the nonelectric catch rate when the anodes were at the headrope. The difference between the two values (2.15 and 2.39) is 0.24 or about 11 percent of the former and 10 percent of the latter. The approximate 10-percent difference might have been due to the directional force of the field. With the anodes on the headrope the directional effect might have brought the fish off of the bottom before they became stunned and drifted back into the net. This is another point needing further investigation and clarification.

A seasonal fishery exists in New England based upon whiting (Merluccius sp.). While the electric catch rate was 4.43 times that of the nonelectric comparative rate, a significant difference in catch rate is apparent between electrical catches with the anodes in different positions. While the anodes were at the footrope, a catch rate of 7.78 fish per tow resulted; a comparative rate of approximately 3.44 resulted from fishing with the anodes at the headrope. The difference between the two values is 4.34 which is 55.76 percent and 126.16 percent of the catch rates, respectively, for the footrope and headrope positions of the anodes while fishing.

DISCUSSION

Many questions concerning the type of tests conducted, the conduct of the tests, and their results may be clarified by the following:

1. Experimental electrical fishing was conducted to determine the fishing effectiveness of the method, i.e., of an electric field (as applied) used as an adjunct to an otter-trawl net (a) in a true marine environment, (b) at commercial trawling depths, and (c) in areas suitable for commercial fishing.

2. The specific electrical equipment used was not subject to testing as a "commercial prototype" because it was experimental in nature and was neither a prototype nor intended to be either suitable or recommended for commercial application. However, positive test results may presumably lead to future development of similar equipment for use by the industry.

3. Commercial quantities of fish and competitive tows with commercial trawlers were neither required nor desirable at this stage of experimentation. It was only required that catch results were sufficiently large to allow for evaluation of the effectiveness of the method.

The effectiveness of the electric field in catching fish such as herring (Clupea harengus), which otherwise escape the large mesh net, suggest an applicability to midwater trawling, off-the-bottom trawling, and other similar types of fishing.

We believe that successful future application of electrical fishing in marine waters will be limited only by the amount of investigational effort expended and the development of equipment appropriate to practical use within specific segments of the fishing industry.

APPENDIX

Details of the electrical equipment are available as an appendix attached to the reprint of this article. Write for Separate No. 734. It contains details on the power source, pulse forming and firing circuits, electrical control panel, auxiliary power source, transmission line, net transformers, modifications during experiments, electrodes, and splices.

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"PUSH" FROM BEHIND MOVES FISH FORWARD IN A SCHOOL

Fish in a school may move forward because of stimuli from behind them--not because they are leading or following a fish in front. This new theory about the movements of fish has been set forth by Dr. Evelyn Shaw, Department of Animal Behavior, American Museum of Natural History, New York City.

After working with hundreds of young atherina fish, similar to the silversides, Shaw concludes that each fish in a school moves forward in response to a neighboring fish moving past its eye vision.

As one fish from behind moves, this movement stimulates the fish ahead which moves and triggers the next fish, and so on. In this way the whole school moves forward. As for the last fish, she said, it seems to straggle and lag behind.

Fish can see a wide area on both sides of the body. The vision is almost semicircular, sweeping from mouth to tail. Thus a movement from behind is easily noticed.

Shaw conducted her experiments on different fish of the schooling or social type, such as the common household pet, the tetras, and the zebra fish. She placed tanks of those fish inside a rotating drum which had stripes, usually yellow and black, painted on the inner walls. As the drum was turned, the stripes would move and the fish would be stimulated to move, tending to lead rather than follow the patterns. (Science News Letter, November 14, 1964.)

TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 16--
AN EXPLORATORY FISHING
AND GEAR RESEARCH BUOY:

A new unit has been developed and used aboard the exploratory fishing vessels Silver Bay and Oregon of the U. S. Bureau of Commercial Fisheries South Atlantic Exploratory Fishing and Gear Research Station, Brunswick, Ga., and the George M. Bowers of the Gear Research Station, Panama City, Fla.

MATERIALS AND APPROXIMATE COST LIST

Item	Qty	Unit	Unit Price	Total
			$	$
Pigtail socket	2	ea.	0.22	0.44
Conduit pipe	19	ft.	0.27	5.13
Wire from battery to light	20	ft.	0.02	0.40
Elbow, 45°	2	ea.	0.70	1.40
Styrofoam	7	ft.	0.52	3.64
Radar reflector (address: Vendo Company, Kansas City, Mo., Contract No. NU-6468)	1	ea.	3.50	3.50
Batteries, 6V., lantern type	2	ea.	1.20	2.40
Cement, sakrete1/ (50#)	½	bag	0.90	0.90
X-condulet, 1"	1	ea.	2.70	2.70
Plywood for box & shield	½	sheet	4.00	4.00
Pipe clamps, 1"	1	ea.	0.10	0.10
Brads for box	1	box	0.15	0.15
Clamp & screws	2	ea.	0.35	0.70
Tape	2	roll	1.15	2.30
Fluorescent paint	1	pt.	2.70	2.70
Total				30.46

1/Use of trade names is for identification only and does not imply endorsement of the company or product named.

The new unit meets the need for an inexpensive, reliable, and easily constructed fishing buoy and is adaptable to commercial use. The buoy is used to mark fishing gear in the water, to serve as a reference point for trawling, dredging, and gear research activities. Painted international orange, it has proved suitable for both day and night operations. CAUTION: Attempting to improve daylight visibility of the buoy through addition of a flag to the buoy top may create vibrations during operations which damage the light bulb filaments; however, use of such a flag is not considered necessary under normal operating conditions.

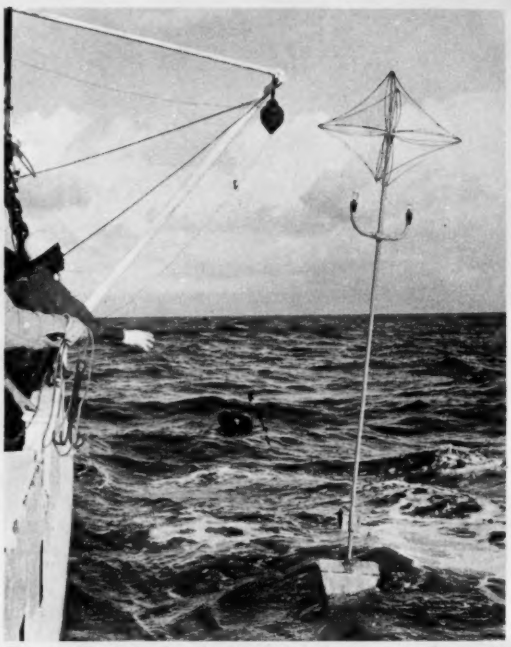


Fig. 1 - New type of exploratory fishing buoy used by Bureau of Commercial Fisheries exploratory fishing vessels to mark fishing gear in the water.

Basic features of the buoy include aluminum conduit, styrofoam flotation, two blinking lights, and fluorescent paint. Construction details are given in the accompanying diagrams (fig. 2, page 13) and list of materials and cost.

--By F. J. Hightower,
Fishery Methods and Equipment Specialist
Pascagoula, Miss., and
A. J. Barrett, Mate, M/V Oregon,
Brunswick, Ga., Exploratory Fishing and
Gear Research Stations,
U. S. Bureau of Commercial Fisheries.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 735

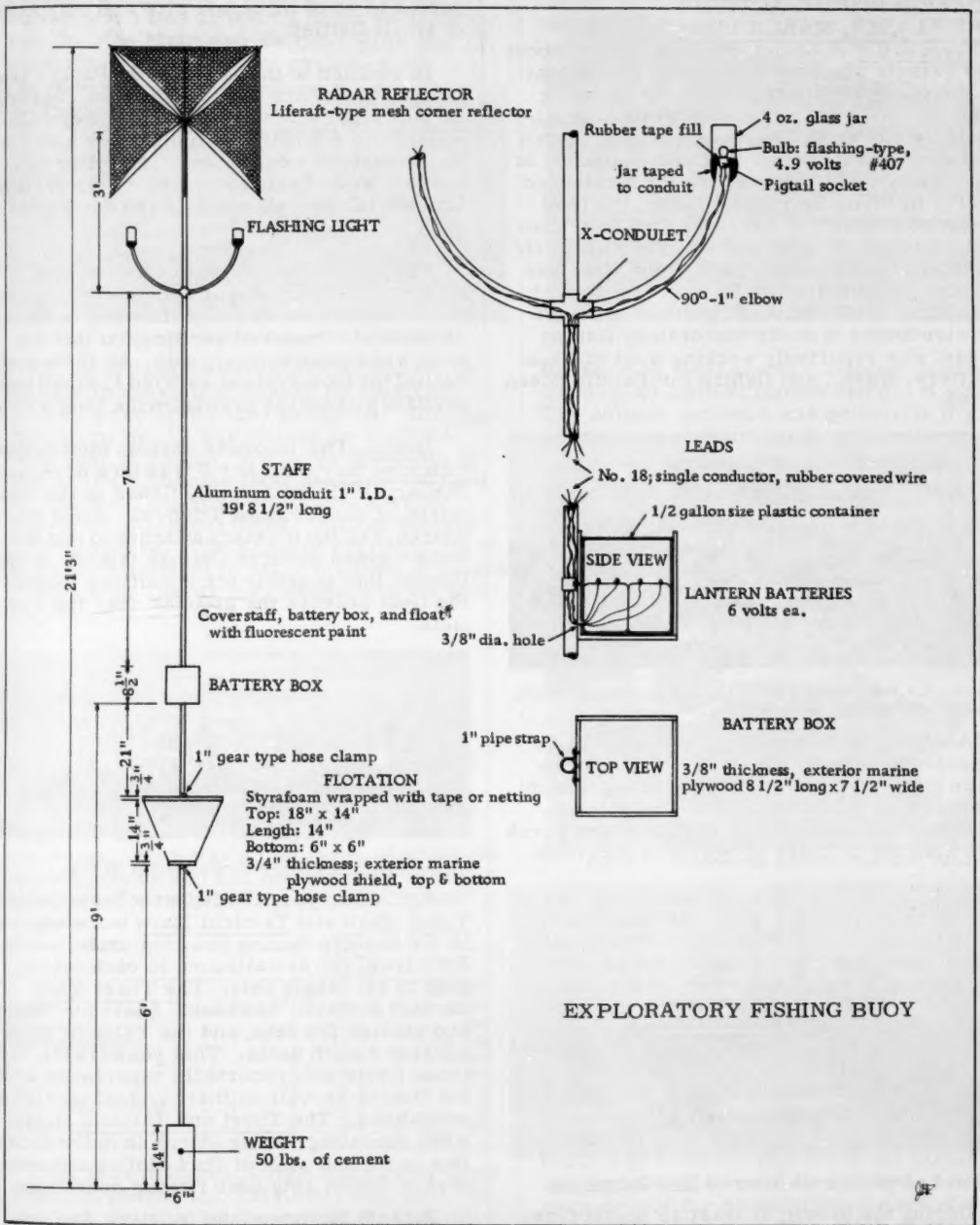


Fig. 2 - Construction details of new exploratory fishing buoy.

Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, MARCH 1965:

U.S.S.R.: A Soviet trawling fleet of about 100 vessels previously centered off Yakutat in February 1965 shifted southward during March. Early in the month a gradual southeasterly movement began and by mid-March that fleet was centered off Cape Ommaney at the entrance of Chatham Strait and extended nearly to Dixon Entrance. Later, the fleet returned northward, breaking into 2 sections, one centered off Sitka and the other again off Yakutat. Observations showed the fleet was consistently fishing for Pacific ocean perch, with little catch of other species. A Soviet trawler known to be an exploratory fishing vessel was reportedly working west of Cape Flattery, Wash., and fishing for Pacific ocean perch.

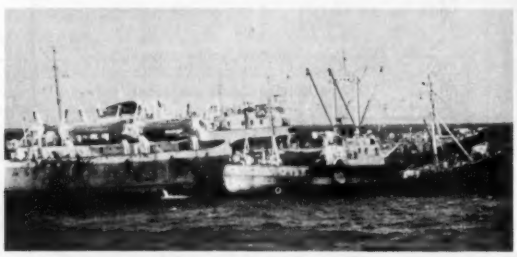


Fig. 1 - U.S.S.R. trawler (SRT-R Komandor) offloading Pacific ocean perch to reefer vessel in Bering Sea.

Another Soviet trawling fleet of about 15 vessels, including at least 9 BMRT factory stern trawlers, was operating during March southwest of Kodiak near Chirikof Island. Observations showed that Pacific ocean perch was also the primary objective of that fleet.

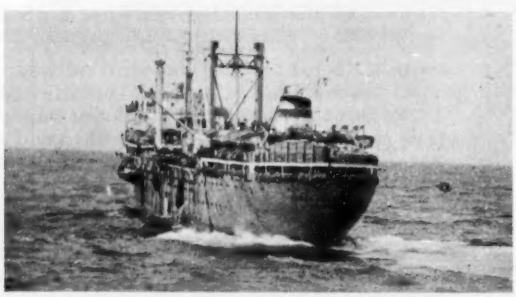


Fig. 2 - Soviet king crab factoryship Pavel Chebotnyagin.

During the month, at least 15 Soviet trawlers were engaged in a flounder fishery on the outer Bristol Bay flats some 20 miles north of Unimak Island. Their catches were reported to be of moderate size and composed of small flatfish.

In addition to the factoryship Pavel Chebotnyagin, two of her sister ships, the Aleksandr Obukov and Konstantin Sukhanov, were also engaged in a tangle-net fishery for kind crab in the eastern Bering Sea. The latter two vessels were fishing about 90 miles north of Unimak Island well north of the designated crab pot sanctuary.

The Pavel Chebotnyagin was working in an area closed to tangle-net fishing. But the vessel moved north out of the area on March 29 when she received verification that the area was closed to tangle nets. As in the past, each of the factoryships carried 12 small boats used for picking the crab from the tangle nets.

Japan: The Japanese shrimp factoryship Chichibu Maru and her 9 trawlers have since January 1965 consistently fished in the area north of the Pribilof Islands. About mid-March, 2 of the trawlers attached to that fleet were sighted north of Unimak Island. It was thought that possibly ice conditions forced the fleet to leave the grounds near the Pribilofs.

Fig. 3 - Japanese stern-ramp factory trawler.

Again this year the Japanese factoryships Tokei Maru and Tainichi Maru were engaged in the eastern Bering Sea king crab fishery. Five trawlers are attached to each factoryship to set tangle nets. The Tokei Maru carries 8 small "kawasaki" boats for hauling and picking the nets, and the Tainichi Maru carries 9 such boats. This year (1965), both those fleets will reportedly experiment with pot fishing as well as their typical tangle-net operations. The Tokei and Tainichi fleets were operating during March in outer Bristol Bay north and west of Port Moller somewhat east of Soviet king crab fishing operations.

Japan's factory stern trawlers Akebono Maru Nos. 53 and 71 were during March last

reported northwest of Unimak Pass and were probably fishing for Pacific ocean perch. It was believed that at least 2 other such trawlers, the Aso Maru and Akebono Maru No. 72, were also working in that general area.

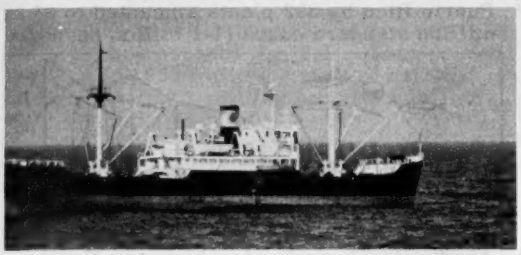


Fig. 4 - Japanese supply ship operating in Bering Sea.

Of the 4 Japanese trawlers scheduled to operate in the Gulf of Alaska by May 1965, 3 already were in the area in March. The Daishin Maru No. 12 was fishing on Portlock Bank east of Kodiak, the Taiyo Maru No. 82 was on the Albatross Bank southwest of Kodiak, and the Takachiko Maru was working southwest of Unimak Pass. All are factory stern trawlers. The Akebono Maru No. 53 was also scheduled to enter the Gulf of Alaska in March but had so far remained in the Bering Sea.

* * * * *

ALASKA FISHERY CATCH ESTIMATES FOR 1964:

The 1964 commercial catch of fish and shellfish in Alaska during 1964 amounted to some 496 million pounds with an ex-vessel value of $58.4 million, according to preliminary data of the Alaska Department of Fish and Game. This was an increase of about 104 million pounds and $12 million over 1963. Landings of several of the more important species are:

Species	Million Pounds	Value
		$1,000
Halibut	28.0	3,900
Herring	46.6	694
Salmon	312.0	43,140
Dungeness crab	12.7	1,400
King crab	86.7	8,800
Shrimp	7.8	312
Clams (shell weight)	0.1	10
Other	2.0	160
Total	495.9	$58,416

The 1964 halibut landings were down about 3 million pounds and $261,000 from 1963. In contrast, herring landings were up 15.4 million pounds and $226,000. The increased herring catch resulted from the improved market

Fig. 1 - Gill-netter fishing for king salmon.

for herring meal and oil. Salmon landings were up 89 million pounds and $11.8 million. The salmon increase was primarily in greater landings of chum, pink, and sockeye.

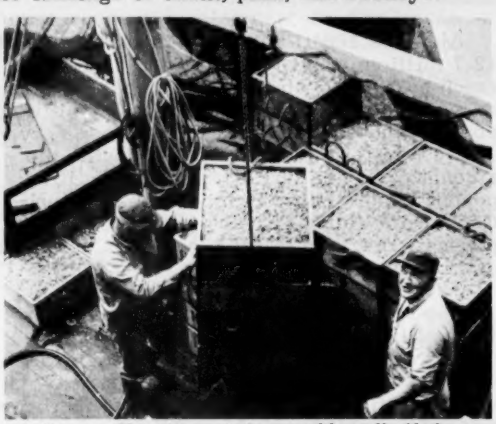


Fig. 2 - Unloading pink shrimp at Wrangell, Alaska.

The Dungeness crab catch was up 600,000 pounds and $43,000. King crab was up 8 million pounds and $1.2 million. Shrimp landings dropped 7.3 million pounds and $293,000. The clam catch was down 310,000 pounds and $42,000, a drop of over 75 percent from the previous year.

* * * * *

CRAB AND SHRIMP PRODUCTION, 1964:

Alaska's 1964 catches of king and Dungeness crab were the highest in the history of the Alaskan fisheries, according to preliminary data of the Alaska Department of Fish and Game. The king crab catch of 86.7 million pounds was more than 4.5 times the catch

of 5 years earlier and almost 10 times more than 10 years ago. The Aleutian Islands area was the highest producer of crabs in 1964 with a catch of 33.6 million pounds, or double the 1963 catch. The very large increase in that area is attributed to a number of factors, including the increased number of floating processors, the shift of some vessels to the area because of the loss of processing facilities in Kodiak because of tidal wave damage, and the natural growth of the fishery which has been in progress for several years.

Despite the March 1964 earthquake and seismic wave, the Kodiak area was the second highest king crab producer in 1964 with a catch of 29.6 million pounds. The Alaska Peninsula area followed with 15 million pounds and the Cook Inlet area with 6.9 million pounds. The Chignik, Prince William Sound, and Southeastern Alaska areas produced 1.6 million pounds.

Alaska's 1964 Dungeness crab landings of 12.7 million pounds topped the 1963 record catch by 600,000 pounds. Southeastern Alaska was the highest producer with 4.6 million pounds. The Kodiak area was a close second with 4.3 million pounds, almost double the amount produced in 1963. The 3.4 million pounds caught in the Prince William Sound-Copper and Bering Rivers area was 150,000 pounds more than in 1963, and the Cook Inlet catch totaled 400,000 pounds.

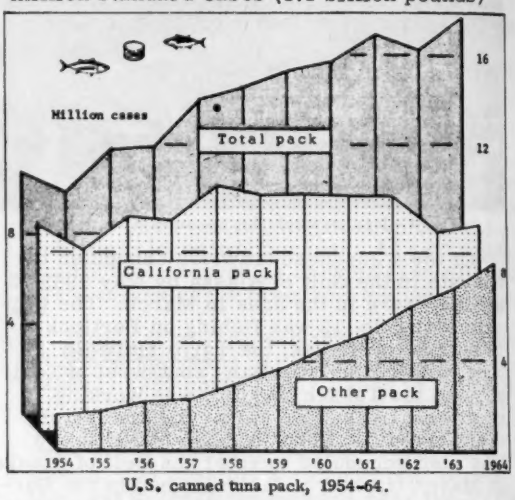
The Alaska shrimp catch dropped from 15.1 million pounds in 1963 to 7.8 million pounds in 1964. The lower 1964 shrimp landings were not due to a resource scarcity, but a combination of loss of processing facilities and unfavorable market conditions.

The Alaska Department of Fish and Game pointed out that the continued increase in shellfish production is of special significance to Alaska's economy. Fishermen received about $10.5 million for their 1964 landings and about another $10 million was paid to workers in processing the catch. Income from the growing year-round fishery industries is of vital importance to Alaska, and particularly its coastal communities, the Department's Commissioner stated.

Canned Fishery Products

U.S. PACK, 1964:

The 1964 pack of canned fishery products in the United States, American Samoa, and Puerto Rico by 322 plants amounted to 35.2 million standard cases (1.1 billion pounds)



U.S. canned tuna pack, 1954-64.

U.S. Pack of Canned Fishery Products, 1964

PRODUCT	NUMBER OF PLANTS	STANDARD CASES	PIECES PER CASE	POUNDS	VALUE
CANNED PRODUCTS:					
FOR HUMAN CONSUMPTION					
SALMON	108	3,765,307	48	179,774,736	$94,257,387
SARDINES:					
MAINE	23	865,751	23.4	20,256,573	7,583,821
PACIFIC	7	120,850	45	5,438,250	1,029,903
TUNA:					
SOLID	32	4,519,308	21	94,907,358	61,011,459
CHUNKS	23	11,915,930	19.5	232,360,635	147,213,291
FLAKES AND GRATED	28	1,253,677	18	22,565,586	9,350,701
TOTAL	1/ 35	17,669,005	-	349,834,179	217,565,651
TUNALIKE FISH	5	26,674	21-19.5-18	466,743	177,062
ALEWIVES	6	74,581	45	2,356,145	611,402
MACKEREL	9	1,070,823	45	48,187,035	6,780,060
SHAD	5	1,235	45	50,770	10,885
FISH CAKES (PRINCIPALLY GROUNDFISH)	3	60,372	48	2,897,856	845,287
GEFILTEFISH	5	211,756	48	14,973,792	5,095,132
SALMON, SMOKED	24	1,840	48	88,320	142,208
STURGEON, SMOKED AND SPREADS	15	1,060	48	49,920	61,655
TUNA SPECIALTIES:					
SMOKED, CREAMED AND SPREADS	7	8,213	48	394,224	98,784
WITH NOODLES	3	49,341	48	2,320,360	885,894
ANCHOVY PASTE	4	1,066	48	51,264	73,220
MISCELLANEOUS FISH SPECIALTIES	23	110,380	48	5,298,240	1,305,932
FISH ROE AND CAVIAR	14	64,042	48	3,074,016	2,302,493
TOTAL FISH	-	24,199,476	-	636,319,236	339,212,223
CRAB MEAT	30	202,314	19.5	3,700,123	7,503,824
CRAB MEAT SPECIALTIES	10	15,459	48	710,032	296,537
LOBSTER MEAT AND SPECIALTIES	6	15,197	48	729,456	311,302
SHRIMP	23	649,332	15	2/ 9,739,980	12,917,360
SHRIMP SPECIALTIES	11	12,235	48	587,280	265,637
CLAMS AND CLAM PRODUCTS:					
WHOLE	8	15,269	15	229,035	229,315
MINCED	23	363,292	15	2/ 5,449,380	5,467,399
CHOWDER	17	1,110,052	30	2/33,466,560	7,435,013
JUICE	12	121,451	30	2/ 3,643,530	580,663
TOTAL	1/ 41	1,915,544	-	2/45,788,208	14,715,452
CLAM SPECIALTIES	10	65,350	48	3,136,800	1,189,625
CONCH MEAT	3	5,307	48	288,630	182,785
OYSTERS	28	422,261	14	2/ 5,911,654	5,291,680
OYSTER SPECIALTIES:					
SMOKED	7	337	48	14,736	27,984
STEWS	6	113,169	48	5,432,112	2,080,934
BISQUE AND SOUPS	7	2,650	48	127,200	46,271
SQUID	9	214,649	48	10,303,152	697,488
TURTLE MEAT, SOUPS AND STEWS	9	17,043	48	810,064	271,158
MISCELLANEOUS SHELLFISH SPECIALTIES	9	13,327	48	639,696	162,405
TOTAL SHELLFISH	-	3,655,436	-	89,887,146	46,142,980
TOTAL FOR HUMAN CONSUMPTION	-	27,854,910	-	726,206,382	385,354,613
BAIT AND ANIMAL FOOD:					
ANIMAL FOOD	56	7,341,670	48	352,400,160	43,670,760
SALMON EGGS FOR BAIT	9	21,906	48	1,051,488	2,162,795
TOTAL BAIT AND ANIMAL FOOD	1/ 65	7,363,576	-	353,451,648	45,833,555
GRAND TOTAL	1/322	35,218,486	-	1,079,658,030	430,988,168

1/ EXCLUSIVE OF DUPLICATION.
2/ DRAINED WEIGHT.
3/ "CUT OUT" OR "DRAINED" WEIGHTS OF CAN CONTENTS ARE GIVEN FOR WHOLE OR MINCED CLAMS, AND NET CAN CONTENTS FOR OTHER CLAM PRODUCTS.

NOTE: LISTS OF CANNERS OF FISHERY PRODUCTS BY INDIVIDUAL COMMODITIES MAY BE OBTAINED FROM THE OFFICE OF INFORMATION, U.S. FISH AND WILDLIFE SERVICE, WASHINGTON, D.C. 20240.

valued at $431.0 million to the packers. Compared with 1963, the pack was up 648,000 cases and $9.4 million. The gain resulted mainly from a record pack of tuna and increases in the pack of salmon and animal food.

The 1964 pack for human consumption; (726.5 million pounds) was 2.4 million pounds less than in 1963 while the pack of bait and animal food (353.5 million pounds) was 46.5 million pounds more.

Cans--Shipments for Fishery Products, January-February 1965

A total of 414,359 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-February 1965 as compared with 353,854 base boxes used during the same period in 1964.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel. (In the year 1964 tonnage data were based on the factor 23.5 base boxes per short ton of steel; and in the years 1962 and 1963 tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.

Central Pacific Fisheries Investigations

SKIPJACK TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 79 (February 10-March 10, 1965): To collect biological data on skipjack tuna (aku) and other related studies was the objective of this cruise by the research vessel Charles H. Gilbert, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The areas of operation were south and northwest of the Hawaiian Islands--Area 1 approximately 10°-12° N. and 158°-149° W., and Area 2 between 24°-20° N. and 170°-158° W.

During the cruise, blood and serum samples of 70 skipjack and 5 yellowfin tuna were taken from fish landed from a single school successfully fished 8 miles northwest of Kaula Island. Also, large volume tuna whole blood samples were taken from 22 skipjack and 5 yellowfin tuna for use as standards in future reagent development studies by the Bureau's Honolulu Biological Laboratory.

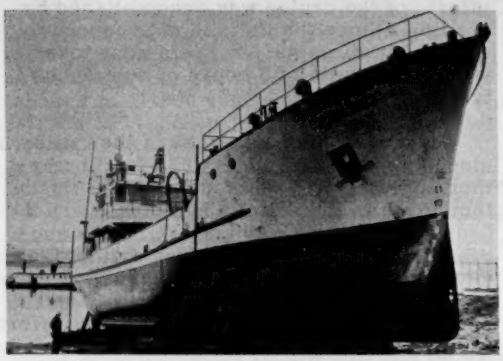


Fig. 1 - Charles H. Gilbert, research vessel of the U.S. Bureau of Commercial Fisheries. Note underwater observation chamber at the bottom of the bow end.

Measurements and sex determinations were made for the 70 skipjack and 5 yellowfin sampled from the school off Kaula Island. All of the fish were judged immature with the skipjack ranging from 43.1 to 57.9 centimeters (about 16.9 to 22.8 inches) and the yellowfin ranging from 66.7 to 75.9 centimeters (about 26 to 29.9 inches).

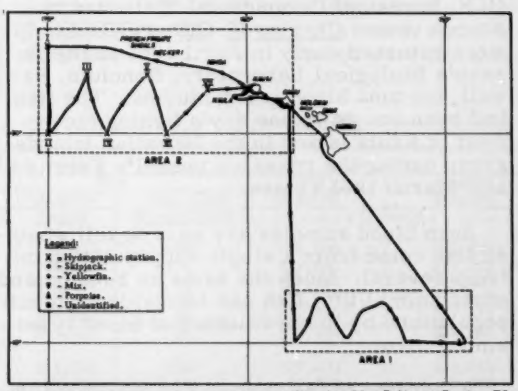


Fig. 2 - Shows area of operations of Charles H. Gilbert Cruise 79 (February 10-March 10, 1965).

Six skipjack schools, 2 yellowfin schools, 2 mixed schools (skipjack-yellowfin), 1 porpoise school, and 1 unidentified school were observed. Only one skipjack tuna school was observed and that was in Area 1. The other schools were spotted along the cruise track to the areas. The single successful fishing

effort of the cruise was accomplished by trolling. Since the fish did not respond to chumming attempts, the specimens taken were the results of 5 hours of continuous trolling.

Oceanographic operations of the cruise included making 270-meter (886 feet) bathythermograph (BT) casts and taking surface temperature and salinity samples every 3 hours while under way and after each successful fishing effort. Surface salinity samples, temperatures, and BT casts were also made every 3 hours while under way and following the single successful fishing effort, and standard weather observations were made.

Drift cards were released every 3 hours at BT stations while beyond 25 miles of land and hourly within 25 miles of land. Seven oceanographic stations were occupied, each involving a single 300-meter (984 feet) cast with 8 Nansen bottles placed at various depths.

A total of 5 yellowfin tuna and 2 little tuna were returned alive to the Honolulu Biological Laboratory for behavior studies.

Note: See Commercial Fisheries Review, February 1965 p. 16.

* * * * *

SKIPJACK TUNA BLOOD GROUP STUDIES:

Blood and serum samples taken from 70 skipjack and 5 yellowfin tuna caught by the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert (Cruise 79) were returned early in April 1965 to the Bureau's Biological Laboratory, Honolulu, Hawaii, for tuna blood group studies. The fish had been caught in one day's fishing northwest of Kaula Island in the Hawaiian Islands group during the research vessel's February-March 1965 cruise.

Such blood samples are used to tell whether fish come from a single subpopulation or from several. Much the same as humans and other animal life, fish can be divided into subpopulations by the prevalence of blood types among them.

According to the Director of the Bureau's Honolulu Biological Laboratory, finding out how many subpopulations exist among the various fish species is more than an interesting intellectual puzzle. The skipjack tuna (aku) is by far Hawaii's most important commercial fishery. That same species of tuna is caught in great numbers off the west coast of North America. If that fishery were sharply stepped up, as has been suggested, would the Hawaiian fishery decline? The answer lies in part in whether the fish all come from the same subpopulation.

The blood samples were taken to the Tuna Blood Group Center at the Bureau's Laboratory's headquarters on the edge of the University of Hawaii campus and analyzed. The Bureau scientists found that the skipjack tuna caught by the research vessel came from a distinct subpopulation they are calling Type Two, and that it seems to be found in Hawaiian waters throughout the year. Whether it is spawned and spends its life in those waters is as yet unknown. Some skipjack tuna spawning has been observed in Hawaiian waters, and has also been found near the Line Islands and the Marquesas.

One scientific theory holds that the skipjack population is much like that of Honolulu. It may consist of residents and visitors. The very large skipjack landings during summer could reflect that fact. But so far, of the million or more skipjack tuna landed in Hawaii every year, the "last known residence" of only two fish has been confirmed. Those were skipjack tagged off the coast of Baja California in 1960 and caught in Hawaiian waters in 1962.

Cruise 79 of the research vessel Charles H. Gilbert is the first of several designed to discover what subpopulations are in the local waters at different times of the year. In planning that cruise, the scientists took a leaf from the fishermen's book. Fishermen let bird flocks lead them to fish schools. The Bureau's Honolulu Biological Laboratory drew on several years' records of bird flock sightings to lay out the cruise. Two areas were investigated during the cruise, one to the southeast of the Islands and the other to the northwest. The first of those areas contains waters of the California Current Extension, which is suspected of playing a large role in the introduction of skipjack tuna into the Hawaiian fishery during the spring and summer. The second area has been known to have, during various times of the year, numerous skipjack schools. How the different types of waters around Hawaii interact and how they respond to the wind systems is the object of a major study at the Bureau's Honolulu Biological Laboratory, viz., the Trade Wind Zone Oceanography Program.

Note: See Commercial Fisheries Review, April 1965 p. 18.

Federal Purchases of Fishery Products

DEFENSE DEPARTMENT'S NEW INSPECTION REQUIREMENTS FOR FROZEN RAW BREADED FISH PORTIONS:

New inspection requirements, effective June 1, 1965, for frozen raw breaded fish portions purchased by the U. S. Department of Defense were announced in Headquarters Notice to the Trade No. 25 (65) of March 17, 1965, issued by the Defense Subsistence Supply Center, Chicago, Ill.

The new inspection requirements are contained in DSSC Articles 341 of June 1, 1965 (which replace DSSC Articles 341 of July 1, 1964) and will be cited in DSSC contracts for fish portions awarded on and after June 1, 1965.

Copies of the revised inspection requirements for fish portions may be obtained from regional offices of the Defense Subsistence Supply Center.

* * * * *

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-MARCH 1965:

Fresh and Frozen: Purchases of fresh and frozen fishery products in March 1965 for the use of the Armed Forces were up 12 percent in quantity and 18 percent in value from the previous month. The increase was due mainly to larger purchases of higher-priced items such as shrimp, scallops, and haddock portions.

Compared with the same month in 1964, purchases in March 1965 were down 5 percent in quantity, but up 25 percent in value. Average prices for shrimp and scallop purchases in March 1965 were up sharply from March 1964, and prices for most fish fillet items were also higher.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, March 1965 with Comparisons

QUANTITY				VALUE			
March		Jan.-Mar.		March		Jan.-Mar.	
1965	1964	1965	1964	1965	1964	1965	1964
(1,000 Lbs.)				($1,000)			
2,272	2,382	6,678	6,790	1,550	1,236	4,326	3,555

Total purchases in January-March 1965 were down 2 percent in quantity, but up 22 percent in value from those in the same period of 1964. Haddock portions were purchased in much larger quantity during the first quarter or 1965, but the increase was offset by smaller purchases of scallops, eastern oysters, flounder fillets, and haddock fillets.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, March 1965 with Comparisons

Product	QUANTITY				VALUE			
	March		Jan.-Mar.		March		Jan.-Mar.	
	1965	1964	1965	1964	1965	1964	1965	1964
	(1,000)				($1,000)			
Tuna	1,548	529	2,189	1,457	650	236	941	644
Salmon	2	-	8	679	2	-	7	416
Sardine	35	19	146	79	20	8	89	30

Canned: Sizable lots of canned tuna were purchased for the Armed Forces in both January and March 1965. Canned sardines were

Table 1 - Principal Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, March 1965 with Comparisons

Product	March				Jan.-Mar.	
	1965		1964		1965	1964
	Quantity	Avg. Cost	Quantity	Avg. Cost	Quantity	Quantity
	Pounds	Cents/Pound	Pounds	Cents/Pound	(Pounds)	
Shrimp:						
raw headless	92,400	98	99,150	79	276,800	282,050
peeled and deveined	165,500	141	46,472	106	319,660	231,222
breaded	326,500	88	348,900	65	929,920	979,200
molded and breaded	60,650	66	107,300	58	155,900	115,000
Total shrimp	645,050	101	601,822	69	1,682,280	1,607,472
Scallops	217,304	85	299,900	54	538,884	691,000
Oysters:						
Eastern	68,718	97	121,530	101	207,490	326,918
Pacific	35,426	80	21,676	64	97,652	73,806
Total oysters	104,144	91	143,206	95	305,142	400,724
Fillets:						
Cod	41,520	36	22,700	34	156,270	127,246
Flounder	178,050	38	316,000	37	802,500	1,173,816
Ocean perch	313,500	34	348,520	30	1,008,290	1,011,120
Haddock	183,550	37	217,650	32	455,550	569,244
Haddock portions	188,504	47	-	-	498,054	8,650
Steaks:						
Halibut	113,770	51	112,500	37	322,420	307,025
Salmon	18,250	64	25,735	67	32,740	49,302
Swordfish	400	62	2,610	56	1,260	5,310

also purchased in moderate quantity during the first quarter of 1965.

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, May 1965 p. 17.

Fish Sticks and Portions

U. S. PRODUCTION, 1964:

The United States production of fish sticks and portions during 1964 amounted to 179.2 million pounds valued at $66.3 million--a gain of 3 percent in quantity and 1 percent in value as compared with 1963. Fish sticks totaled 73.5 million pounds in 1964--5.8 million pounds or 7 percent below 1963, and fish portions amounted to 105.6 million pounds--up 11.0 million pounds or 12 percent.

Table 1 - U. S. Production of Fish Sticks by Months and Type, 1964 1/

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
January	6,709	517	7,226
February	6,595	467	7,062
March	6,417	548	6,965
April	5,468	403	5,871
May	5,251	406	5,657
June	3,700	521	4,221
July	3,398	407	3,805
August	5,675	630	6,305
September	5,944	533	6,477
October	6,683	343	7,026
November	5,749	398	6,147
December	6,221	549	6,770
Total quantity: 1964 1/	67,810	5,722	73,532
1963	74,137	5,165	79,302
	($1,000)		
Total value: 1964 1/	27,997	1,974	29,971
1963	29,734	1,856	31,590

1/Preliminary.

Table 2 - U.S. Production of Fish Sticks by Months, 1960-64

Month	1964	1963	1962	1961	1960
	(1,000 Lbs.)				
January	7,226	7,554	6,082	6,091	5,511
February	7,062	8,241	6,886	7,097	6,542
March	6,965	8,053	7,658	7,233	7,844
April	5,871	6,546	5,719	5,599	4,871
May	5,657	5,750	5,643	5,129	3,707
June	4,221	6,125	5,117	4,928	4,369
July	3,805	4,870	3,740	3,575	3,691
August	6,305	5,696	5,760	6,927	5,013
September	6,477	5,865	6,582	5,206	5,424
October	7,026	8,128	6,698	6,133	6,560
November	6,147	6,471	6,305	6,288	6,281
December	6,770	6,003	6,027	5,618	5,329
Total	73,532	79,302	72,217	69,824	65,142

1/Preliminary.

Table 3-U.S. Production of Fish Sticks by Areas, 1964 and 1963

Area	1/1964		1963	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	57,375	24	64,205
Inland & Gulf States	7	8,269	7	8,316
Pacific Coast States	12	7,888	13	6,781
Total	42	73,532	44	79,302

1/Preliminary.

Table 4-U.S. Production of Fish Portions by Months, 1964 1/

Month	Cooked	Breaded Uncooked	Total	Un-breaded	Total
	(1,000 Lbs.)				
January	1,540	7,022	8,562	258	8,820
February	1,742	6,279	8,021	420	8,441
March	2,111	6,408	8,519	185	8,704
April	1,950	5,905	7,855	105	7,960
May	1,722	5,675	7,397	168	7,565
June	1,219	6,227	7,446	169	7,615
July	774	5,665	6,439	105	6,544
August	1,711	7,375	9,086	255	9,341
September	2,544	7,100	9,644	129	9,773
October	2,033	8,739	10,772	293	11,065
November	1,742	8,921	10,663	201	10,864
December	1,868	6,819	8,687	253	8,940
Total qty. 1964 1/	20,956	82,135	103,091	2,541	105,632
Total qty. 1963	16,623	74,967	91,590	3,054	94,644
	($1,000)				
Total value 1964 1/	8,667	26,712	35,379	910	36,289
Total value 1963	6,846	26,099	32,945	1,035	33,980

1/Preliminary.

Table 5 - U. S. Production of Fish Portions by Areas, 1964 and 1963

Area	1/1964		1963	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	26	63,955	27	53,211
Inland & Gulf States	9	38,981	10	38,222
Pacific Coast States	11	2,696	11	3,211
Total	46	105,632	48	94,644

1/Preliminary.

Table 6-U.S. Production of Fish Portions by Months, 1960-64

Month	1/1964	1963	1962	1961	1960
	(1,000 Lbs.)				
January	8,820	8,173	5,077	4,303	3,632
February	8,441	7,361	6,360	4,902	3,502
March	8,704	8,835	7,036	5,831	4,706
April	7,960	7,919	6,408	4,484	3,492
May	7,565	7,293	5,818	3,879	3,253
June	7,615	8,774	6,137	4,039	3,995
July	6,544	4,524	4,679	3,962	4,088
August	9,341	6,684	6,687	4,963	3,558
September	9,773	9,621	7,180	5,745	4,631
October	11,065	9,877	9,871	6,759	5,275
November	10,864	8,136	7,406	5,789	4,790
December	8,940	7,447	6,019	5,191	4,459
Total	105,632	94,644	78,678	59,847	49,381

1/Preliminary.

Cooked fish sticks (67.8 million pounds) made up 92 percent of the 1964 fish stick total, while the remaining 5.7 million pounds or 8 percent consisted of raw fish sticks. A total of 103.1 million pounds of breaded fish

portions (of which 82.1 million pounds were raw) and 2.5 million pounds of unbreaded portions were processed during 1964.

The Atlantic Coast was the principal area in the production of both fish sticks and fish portions with 57.4 and 64.0 million pounds, respectively. The inland and Gulf States were next with 8.3 million pounds of fish sticks and 39.0 million pounds of fish portions. The Pacific Coast States made up the remaining 10.5 million pounds of fish sticks and fish portions.

Fur Seals

PRICES FOR ALASKA SKINS AT SPRING 1965 AUCTION:

The spring auction in 1965 (April 8-9) of United States Government-owned fur seal skins netted $1.67 million (does not include value of 2,237 sheared skins). The average price per skin received for 6,079 male fur seal skins (dyed Black, Kitovi, and Matara) was $116.36 and 7,650 female skins (dyed Black, Kitovi, and Matara) it was $89.21.

Stripping pelt from Alaska fur seal carcasses at killing field on St. Paul Island.

At the fall 1964 auction, the average price per skin (dyed Black, Kitovi, and Matara) for male fur seal skins was $85.56 and for female skins it was $64.34. Of a total of 10,770 Black skins sold at the October 1964 auction, 7,971 were male and the average price was $91.58 per skin; 2,799 were female and the average price for those was $64.38 per skin. At the spring 1964 auction, the three colors of male skins brought an average price of $105.45 per skin, a considerably higher average price than was received at that year's fall auction.

The average price received for both male and female fur seal skins (dyed Black, Kitovi, and Matara) at this year's spring auction was $101.24 per skin. Lakoda (female sheared) seal skins brought an average price of $47.68 each, much less than the average of $59.65 received at the fall 1964 auction, and only slightly below the average of $48.82 received at the spring 1964 auction.

Average prices per skin received for processed male fur seal skins at the spring 1965 auction were: Black $121.23; Kitovi $92.81; and Matara $116.63. Average prices for both male and female dyed skins at this year's spring auction were (average for fall 1964 auction in parentheses): Black $104.03 ($84.51); Kitovi $83.91 ($62.49); Matara $101.86 ($75.89). At the spring 1964 auction the average prices for both male and female dyed skins were: Black $92.47, Kitovi $81.66, and Matara $91.58 per skin.

Note: See Commercial Fisheries Review, December 1964 p. 40; June 1964 p. 15.

Great Lakes Fishery Investigations

CHEMICAL TREATMENT OF SEA LAMPREY-PRODUCING STREAMS IN 1965:

Plans of the U. S. Bureau of Commercial Fisheries to treat 52 sea lamprey-producing streams in northern Michigan starting in spring 1965 through June 30, 1966, were approved this past April by the State of Michigan Conservation Department. A permit issued by Michigan's Conservation Director authorized that Federal agency to apply a selective sea lamprey-killing chemical under rigid safety standards in 20 Lake Superior streams and 32 tributaries of Lake Michigan.

The series of treatments were scheduled to get under way as soon as the run-off from melting snow ended, with stream work beginning in late April in the Lower Peninsula, and the season's first treatments above the Straits about early May. Stream conditions permitting, Stoney Creek in Oceana County was scheduled to be the first in the spring of 1964 to receive chemicals for eradicating sea lampreys. Otherwise, chemical treatment would be started farther south in Van Buren County.

Lake Superior streams on the chemical treatment list include: Gratiot and Little Gratiot Rivers in Keweenaw County; Three Mile Creek, Little Two Heart River, and Two Hearted River in

Luce County; Harlow Creek and Garlic and Little Garlic Rivers, in Marquette County; and Betsy River in Chippewa County; Sullivan Creek, Hurricane River, Miners River, Anna River, Five Mile Creek, Au Train River, Sucker River, Beaver Lake outlet, Rock River, Furnace Creek and Deer Lake outlet in Alger County.

This marks the first chemical treatment attack on sea lampreys in Gratiot and Hurricane Rivers. All of the other waters have been treated before, but stream studies show that sea lamprey populations have come back in them. The scientist in charge of the U. S. Bureau of Commercial Fisheries sea lamprey control program said, "Although re-treatment is necessary in these waters, there is no doubt in our minds that we have made a major breakthrough in controlling lamprey in Lake Superior streams. Lamprey catches at our electric barriers reveal that the predators' population has been reduced 80 percent during the last three years in the lake's treated tributaries." Even more significant to the total effort of restoring Lake Superior's fishery is the improvement in the survival and growth of lake trout, according to the scientist in charge of the program.

The following tributaries of Lake Michigan will also receive attention under the Michigan Conservation Department's latest permit for chemical treatment. They are Fishdam and Little Fishdam Rivers, Ogontz River, and Valentine Creek in Delta County; Milakokia River, Marblehead Creek, Deadhorse Creek, and Bursaw Creek in Schoolcraft County; Hudson Creek, Crow River, Hog Island Creek, Sucker Creek, Rock River, Cataract River, Swan Creek, and Point Patterson Creek in Mackinac County; Carp Lake River, Big Stone Creek, Big Sucker River, and Wycamp Outlet in Emmet County; White River and Norris Creek in Muskegon County; Black River and Brandywine Creek in Van Buren County; Porter Creek, Jordan River, Loeb Creek, McGeach Creek, Horton Creek, and Monroe Creek in Charlevoix County; Stoney Creek in Oceana County; and Grand River in Ottawa County.

Of the Lake Michigan tributaries, Little Fishdam River, Crow River, Carp Lake River, Wycamp outlet, White River, Norris Creek, Black River, Brandywine Creek, Monroe Creek, Stoney Creek, and Grand River would be treated for the first time. The remaining Lake Michigan streams will be phased into a four-year cycle of re-treatment which is geared to destroying reestablished sea lampreys before they have a chance to become parasitic. Normally those eel-like predators reach that stage in their fourth year. The Bureau's scientist in charge of the program reports that good gains have also been made in lowering sea lamprey numbers in treated Lake Michigan streams. If everything goes according to schedule, the first round of treatment of Lake Michigan's lamprey streams will be completed by the end of 1966.

With the progress of those efforts moving so well, the decision has been made to plant 1.3 million yearling lake trout in upper Lake Michigan during summer 1965 to launch the restocking program in those waters.

Under the scheduled timetable, the U. S. Bureau of Commercial Fisheries hopes, after June 1966, to extend its chemical treatment attack on sea lampreys to the Lake Huron area, where 48 streams have been singled out for treatment.

Note: See Commercial Fisheries Review, March 1965 p. 47, December 1964 p. 42.

Gulf Fishery Investigations

Some of the highlights of studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during January-March 1965:

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: In an effort to determine optimum conditions for their growth, four diatoms, three flagellates, and three dinoflagellates, used as food for larval shrimp, were each cultivated in 10 ml. of 9 different media. Periodic checks revealed that the degree of cell multiplication varied with the species tested, but that each organism produced the greatest number of cells in Miquel's sea water with soil extract added; "NH" artificial medium proved second best. No growth was observed in sea-water controls.

The various media were also inoculated at different time intervals to develop a schedule of reinoculation that would sustain vigorous cultures. Culture viability differed greatly between species except that all cultures in Miquel's solution with soil extract maintained good growth with weekly reinoculation

Examination of 103 Gulf-V plankton samples collected in September and October 1963 revealed planktonic-stage penaeids to be approximately three times more abundant in the western (Galveston-Brownsville) than in the eastern (Galveston-Mississippi River) portion of the sampling area. Overall abundance of those forms increased only slightly from that observed in July and August.

Fig. 1 - Sampling postlarvae with a small beam trawl.

Planktonic stages of commercially-important shrimp (Penaeus spp.) also were three times more abundant in the western sector than in the eastern, with only a slight overall increase in abundance from that observed during the preceding 2 months. Greatest concentrations occurred at 15- and 25-fathom stations. The relatively high incidence of nauplial and protozoeal stages indicates that spawning was intensive throughout the sampling area.

Further attempts (November 1964-February 1965) to locate offshore bottom concentrations of Penaeus spp. postlarvae moving into nursery areas were unsuccessful. Sampling 5 to 8 inches above the bottom with a modified Clarke-Bumpus sampler attached to a sled resulted in large catches of postlarval and juvenile Trachypeneus spp. and Sicyonia spp.

Analysis of fish samples collected during monthly shrimp survey cruises January-June 1964 was completed. It shows that the catch of finfish per unit of sampling effort at all depths was approximately 2 to 4 times greater off Louisiana than off Texas. In our initial consideration of questions about interrelationships of the Gulf's shrimp and demersal fish resources, preliminary analysis of 1962 trawl data has revealed that in depths of 15 and 25 fathoms off Louisiana catches of longspine porgies were 1½ times greater in all areas of high brown shrimp density (100 per 1-hr. tow) than in areas where brown shrimp were not as abundant. A similar appraisal of white shrimp and croaker catches in shallower waters indicated no comparable relationship.

Cultivation of Shrimp under Seminatural Conditions: This project was initiated the previous quarter. Its objectives are: (1) to determine the feasibility of culturing shrimp under seminatural conditions; (2) to evaluate the importance of such factors as population density, predation, nature and abundance of food, dissolved O_2, pH, nitrates, nitrites, ammonia, inorganic phosphate, chlorophyll, salinity, and temperature; and (3) to establish the relative costs of building, operating, and maintaining culture ponds.

Stocking of the pilot study's two ⅛-acre ponds at East Lagoon began as the quarter came to a close. Plans are to introduce approximately 9,000 postlarval brown shrimp into each. For comparative purposes, the water in one pond will be changed continuously and the shrimp it contains will be fed daily with a prepared diet. In the other, water will be added only to compensate for that lost through evaporation, and its fertility and pH will be adjusted so as to promote the growth of plankton for natural food.

Florida Bay Ecology Studies: Development of equipment for quantitatively sampling postlarval and juvenile pink shrimp in Florida Bay was continued. Results of testing a suction dredge, which employs the aspirator (or Venturi) principle, appear quite promising. In this method, an area of bottom is enclosed and the entrapped animals, plants, and substratum are lifted by the dredge directly onto graded sorting screens. No water passes through the pump in the process.

Because of this gear's limitations when it is employed to sample from enclosed areas, the suction head assembly was mounted on a sled, which permitted it to be towed over a known distance. In preliminary tests of the "sled's" sampling efficiency versus that of a small beam trawl sweeping an equal area, the sled-mounted suction device caught an average of 14 penaeid shrimp per square meter whereas the beam trawl captured less than 2.

As part of this study, marine plants and animals from the Florida Bay area are being collected, identified, and preserved or mounted for reference. One of the study's major objectives is to relate the role of associated plants and animals to the growth, survival, and distribution of pink shrimp.

Juvenile Phase of the Life History of the Pink Shrimp: Sampling in Buttonwood Canal to determine the cross-sectional distribution of migrating shrimp was conducted with 13 small conical nets (same mesh as channel net) set across the channel at various depths. Sampling proceeded during new-moon, full-moon, and (one) quarter-moon phases. Preliminary analysis of data collected July-December 1964 shows that shrimp tend to concentrate at the surface with less variation from catch to catch during full moon. These observations help to explain the marked differences in earlier abundance estimates derived from samples collected in wing nets without regard to moon phase.

Comparison of data obtained February and March (1965) revealed close agreement between the numbers of shrimp caught in wing and channel nets. If the remaining experimental work gives similarly favorable results, catches in wing nets alone will suffice to estimate the total number of shrimp moving through the canal during periods of full moon. (Conducted by University of Miami under a Bureau contract.)

SHRIMP DYNAMICS PROGRAM: Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: In contrast to their virtual absence in samples collected during past winters, postlarvae were caught regularly in limited numbers throughout the quarter at Aransas Inlet, Galveston Entrance, Rollover Pass, and Sabine Pass. The persistence of postlarvae at these sampling sites may have been related to above-average water temperatures this winter.

A special study at Rollover Pass in late March provided additional information on factors influencing the movement of postlarvae into nursery areas. Samples were taken hourly over three complete tidal cycles (72 hours) by means of a ½-m. plankton net fitted with a flow meter. One of the first samples, collected during a 2-minute tow, contained over 5,500 postlarval brown shrimp.

For the first winter since 1961, local sport fishing enthusiasts enjoyed an uninterrupted supply of bait shrimp.

Bait Shrimp Harvests from Galveston Bay System, 1959-1964

Year	Production	Effort	Species Composition		
			White	Brown	Other
	Pounds	Hours	..... (Percent)		
1964	846,600	23,010	69	30	1
1963	994,640	29,120	61	39	1/
1962	1,062,900	33,610	57	43	"
1961	731,200	25,310	49	51	"
1960	943,400	16,030	59	41	"
1959	504,378	11,715	68	32	"

1/Less than 1 percent.

Migrations, Growth, and Mortality of Commercial Shrimp: A mark-recapture experiment with pink shrimp was initiated in mid-January on the Tortugas grounds off southwest Florida. The experiment's objectives are to secure information on: (1) patterns of pink shrimp dispersal over the fishing grounds; (2) shrimp growth rates during the period January-March; (3) estimates of natural and fishing mortality; and (4) a measure of the variation associated with estimates of natural mortality.

Approximately 12,000 distinctively stained shrimp of restricted size were released--3,000 in each of four areas--along the eastern margin of the Tortugas grounds. By the end of March, 48 percent of the marked shrimp had been recovered. Tests to determine the proportion of nondetected stained shrimp passing through processing plants were conducted at Key West and Marathon, Fla.

Population Studies: Two cruises scheduled to obtain additional information on the escapement of shrimp from fishing trawls were interrupted by poor weather during the quarter. Other project activities included analysis of data gathered during past cruises and preparation for future work. Some problems encountered in determining escapement from parts of shrimp trawls other than the cod-end have been successfully resolved by simultaneously towing three nets constructed with different-size webbing, and comparing the size frequencies of resulting catches. Similar experiments also permitted comparison of escapement from cod-ends without covering meshes. Findings yielded by both approaches suggest that significant losses of shrimp of commercial size occur when meshes larger than 2 inches are used in either the cod-end or body of shrimp trawls.

Seasonal Changes in Indices of Abundance of Postlarval Brown and White Shrimp in Vermilion Bay, La.: Work during the quarter was divided between processing samples of postlarvae collected during a 96-hour study at Marsh Island, and routine sampling in Vermilion and Cote Blanche Bays. Analyses of data gathered in both bays during 1963 and 1964 suggest a close relationship between the preseason density of postlarvae and the subsequent abundance of harvestable white shrimp. Peak densities of the two groups were separated by about a month, indicating relatively rapid shrimp growth. (Conducted by University of Southwestern Louisiana under a Bureau contract.)

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Only the Atlantic Croaker and the bay anchovy contributed significantly to trawl samples collected during the quarter. Since young-of-the-year croaker first entered the estuary last November, their numbers have steadily increased. Anchovy abundance, on the other hand, has declined by more than 90 percent over approximately the same period. A small number of white and brown shrimp remained in the estuary all winter. This phenomenon was not observed in past winters when freezing or near-freezing temperatures effectively precluded the overwintering of shrimp.

Fig. 2 - Bringing a sample trawl in Galveston Bay on board the Tommy Box, a 40-foot vessel used by the staff of the Galveston Fishery Biological Laboratory.

Postlarval brown shrimp were captured in the tidal passes throughout the winter. We therefore initiated our brown shrimp survey in the estuary proper during the last week in January, earlier than originally planned. Postlarvae were present in East and Lower Galveston Bays in late January but unfortunately adverse weather conditions prevented sampling in the upper bays until the second week of February. Postlarvae then occurred everywhere in the estuary except in Clear Lake and upper Trinity Bay. By late March, they were also being caught in these areas.

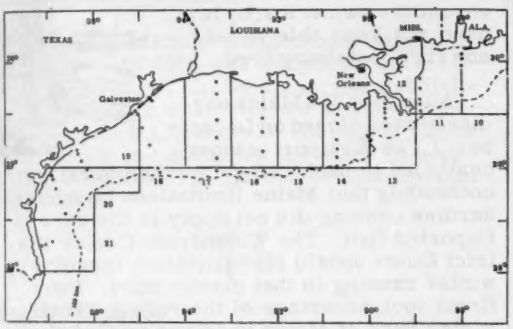
We had previously observed that postlarvae grew very little when water temperatures remained below about 20° C. (68° F.). Bay waters warmed to this level by mid-March and significant postlarval growth was evident by the end of the month. In contrast, postlarvae did not enter the estuary during 1964 until late February and marked growth was not observed until mid-April.

MOVEMENT OF POSTLARVAL SHRIMP FROM OFFSHORE SPAWNING AREAS: The movement of postlarval shrimp into bays from offshore spawning areas is an accepted feature of the Penaeus life cycle. The distances involved coupled with the small size of the postlarvae has caused speculation as to whether this trip represents active or passive movements of the animals. Interest in this problem has led to laboratory measurements of postlarval swimming velocity. The time required for individual brown shrimp postlarvae to swim a known distance was used to estimate speed. Assuming uninterrupted movement and ignoring effects of water movement, we can extrapolate the data to 2.6 miles per day. Further study will be required to determine the capacity of postlarvae to sustain these rates, and to test for the possible influence of environmental factors on postlarval movement. At the moment, however, it is interesting to note that field observations by personnel of the Estuarine Porgram indicate an average velocity of 2 miles per day for the movement of brown shrimp postlarvae through Galveston Bay.

* * * * *

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-27 (March 12-25, 1965): Small white shrimp counting 41-50 to the pound were caught at inshore stations in the up to 10-fathom depth range of 4 statistical areas worked during this cruise by the chartered research vessel Gus III. The vessel, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., covered 8 statistical stations on the cruise, another of a series in a continuing Gulf of Mexico shrimp distribution study.



Station pattern for shrimp distribution studies by M/V Gus III, Cruise GUS-27.

A total of 25 standard 3-hour tows with a 45-foot flat trawl was made. The vessel also made 55 plankton tows, and 42 bathythermograph (BT) and 167 water (Nansen bottle) casts. Bottom core samples were obtained at 16 eastern stations in depths ranging from 7½ to 40 fathoms.

Catches of brown shrimp were generally spotty in all areas, with the largest catch of 21 pounds (26-30 count) from the 11-20 fathom depth of area 18. That area also yielded 6 pounds of 15-20 count brown shrimp from the over 21-fathom depth, and 16 pounds of small white shrimp (41-50 count) from the up to 10-fathom depth. Area 19 yielded 12 pounds of 31-40 count brown shrimp from the 11-20 fathom depth, in addition to small white shrimp (15 pounds of 41-50 count) caught in the up to 10-fathom depth.

A tow in the 11-20 fathom depth of area 13 yielded 12 pounds of white 15-20 count shrimp, and only 2 pounds of the same size were caught in area 16 from the up to 10-fathom depth.

Area 20 yielded some 25 pounds of white and brown shrimp ranging from 15-20 count down to 51-67 count. The largest catch from that area was 9 pounds of 26-30 count brown shrimp from the over 21-fathom depth.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, May 1965 p. 22.

Industrial Fishery Products

U. S. PRODUCTION, 1964:

The production of industrial fishery products in the United States, American Samoa, and Puerto Rico in 1964 by 160 plants was

Menhaden vessel docked at a fishery industrial products plant in Empire, La.

U.S. Industrial Fishery Products Production, 1964

Products	Number of Plants	Unit	Quantity	Value
Marine-animal scrap and meal	109	Tons	235,252	$27,944,858
Marine-animal oils:				
Body oil	74	1,000 lbs.	180,175	13,272,991
Liver oil	2	"	23	24,000
Fish solubles	36	Tons	93,296	5,662,194
Marine pearl shell buttons	6	Gross	406,917	1,004,344
Mussel shell buttons	7	"	226,625	272,281
Oyster shell grit and lime ("Live and reef shells")	14	Tons	362,543	4,914,924
Miscellaneous industrial products	22	-	-	16,551,404
Total	1/ 160	-	-	69,646,996

1/Exclusive of duplication.

valued at $69.6 million--an increase of $1 million as compared with 1963.

The 1964 production of 235,252 tons of fish meal and scrap was 8 percent less than the 255,907 tons produced in 1963, while marine-animal oils (180 million pounds) was 3 percent less, and fish solubles (93,296 tons) declined 7 percent. Other industrial products (agar-agar, kelp extracts, liquid fertilizer, mussel-shell dust and chips, animal feeds, fertilizers, etc.) accounted for the increase in the total value of industrial products in 1964.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES PRODUCTION, MARCH 1965:

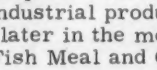
Preliminary data on U. S. production of fish meal, oil, and solubles for March 1965 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U.S. Production 1/ of Fish Meal, Oil, and Solubles, March 1965 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
March 1965:			
East & Gulf Coasts	837	200	40
West Coast 2/	1,921	342	1,048
Total	2,758	542	1,088
Jan.-Mar. 1965 Total	7,157	1,664	2,337
Jan.-Mar. 1964 Total	5,787	1,465	2,793

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

As usual, complete details on United States production of industrial products will appear several weeks later in the monthly statistical publication "Fish Meal and Oil," issued from Washington, D. C.



Maine Sardines

YEAR-ROUND CANNING SEASON APPROVED:

A bill has been passed by the Maine Legislature and signed into law by the Governor to legalize the taking of herring for canning purposes from the coastal waters of Maine on a year-round basis. The new law becomes effective 90 days after the adjournment of the Maine legislature which means it should be in effect before 1966.

For many years the legal season in Maine for taking herring for canning has been from April 15 to December 1, but temporary exceptions were made on an emergency basis for 3 years during World War II, and in 1961-62 when there was a serious fish shortage.

Winter canning of Maine sardines has been costly, and the winter packs have been limited by cold weather, gales, and generally adverse conditions. Purse seining has been the only method by which the fish could be taken; and the canneries, by law, have not been able to take any fish containing feed.

When the 1964 Maine sardine season closed on December 1, an Eastport canner continued to pack using Canadian herring, contending that Maine limitations on winter sardine canning did not apply in the case of imported fish. The Washington County District Court upheld his contention (opening up winter canning in that county only). Four firms took advantage of the ruling. Their winter pack of Maine sardines totaled about 40,000 cases as of April 15, 1965. On the other hand, winter canning with imported fish was barred by a Maine court in Hancock County.

The new legislation will open winter sardine canning to all Maine plants and will allow winter canning with domestic as well as imported herring.

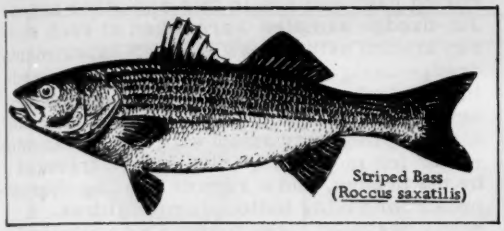
The regular 1965 Maine sardine canning season is expected to produce a normal pack of 1,500,000 to 1,600,000 cases. A total of 23 Maine sardine plants was expected to operate in 1965, and volume production was expected to begin in late May or June.

Note: See Commercial Fisheries Review, April 1965 p. 23.

Maryland

STRIPED BASS TAGGED IN SPAWNING AND MIGRATION STUDY:

In April 1965, nearly 2 tons of striped bass or rockfish were tagged and released in the Patuxent River by a team of scientists from the University of Maryland's Natural Resources Institute studying their spawning and migration habits. The Institute is also conducting a pollution study on the Patuxent Riv-


Striped Bass
(Roccus saxatilis)

er, which is one of the most important striped bass spawning grounds.

A 64-pound female striped bass tagged in the Patuxent in 1964 was caught recently off Cape Hatteras, N. C., by a commercial fisherman. The tag was returned to the Maryland Institute's Chesapeake Biological Laboratory, which is conducting the study in cooperation with the U. S. Bureau of Commercial Fisheries.

North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, APRIL 1965:

There was a continual increase in Soviet fishing activity in the North Atlantic during April 1965. These observations were made by the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fsiheries, Gloucester, Mass., which has been conducting weekly reconnaissance flights cooperatively with the U. S. Coast Guard. A total of 107 vessels were sighted and identified as 53 factoryship stern trawlers, 44 refrigerated and nonrefrigerated side trawlers, 9 processing and refrigerated fish transports, and 1 fuel and water carrier. This compared with 84 vessels sighted in March 1965 and 64 vessels observed in April a year earlier. The increased number of Soviet vessels during April was attributed mainly to the arrival of SRT's and SRT-R's which had not been seen in numbers since they left Georges Bank in September 1964.

Fishing operations of the Soviet vessels generally ranged from south of Montauk Point, Long Island (Hudson Canyon), along the 100-fathom curve of the Continental Shelf to south and southeast of the Nantucket lightship (Veatch Canyon to Lydonia Canyon).

All of the Soviet vessels observed during April were actively engaged in fishing operations and had substantial quantities of fish on deck. Those vessels fishing south of Long Island and Nantucket Shoals were catching primarily red hake and smaller amounts of whiting. It was noted that the Soviet fleet extended its operations to include the southwest part of Georges Bank and appeared to be taking considerable amounts of both herring and whiting.

Soviet processing and refrigerated factoryship Matochkin Shar. Smaller vessels standing by are Soviet trawlers of the Pioneer class. Photo was taken in April 1965, about 60 miles south of Nantucket Island.

A reconnaissance flight was made along the Middle Atlantic coast area during the month where 3 Soviet factoryship stern trawlers were sighted and identified 90 miles east of Cape May, N. J. Each of those 3 vessels had substantial amounts of fish on deck but the species were not identified.

Soviet fishing activity along the Middle Atlantic coast as of April did not develop to the extent that it did in 1964. The species of fish in that area have apparently not been found in sufficient quantity to warrant any major deployment of vessels from the fishing grounds where good catches of red hake, whiting, and herring were being made.

Note: See Commercial Fisheries Review, May 1965 p. 24.

North Atlantic Fisheries Explorations and Gear Development

SURF CLAM SURVEY CONTINUED:

M/V "Delaware" Cruise 65-2 (February 19-March 18, 1965): This cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware off the coast of Maryland and Virginia was a continuation of an Atlantic surf clam survey conducted during the summers of 1963 and 1964. The survey was initiated in cooperation with the Sea Clam Packers Committee of the Oyster Institute of North America.

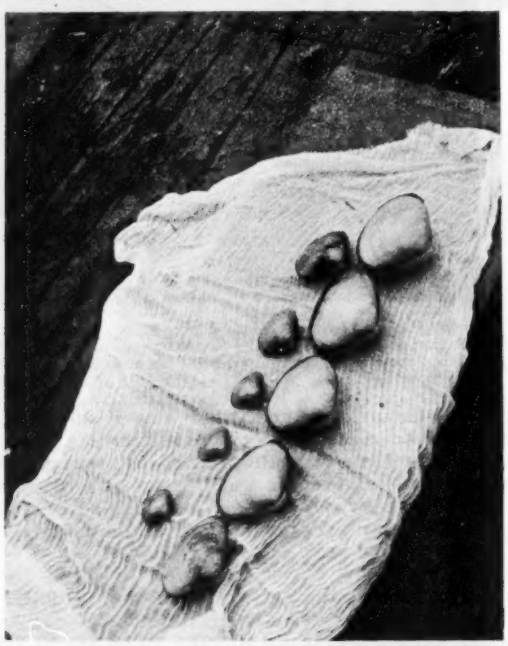


Fig. 1 - Sample of surf clams from one of the tows made aboard the M/V Delaware during Cruise 65-2. The sample shows the size range of the clams. The longest measured six inches in length, the smallest measured two inches.

Objective of Delaware Cruise 65-2 was to survey as much as possible of the remaining unsurveyed section of Surf Clam Area V. Clam explorations in that area had been previously conducted during June-July 1964 by the Bureau's research vessel Rorqual. During this 4-week cruise, commercially usable concentrations of surf clams were found at many of the sampling stations in Survey Area V.

SURVEY PROCEDURE: The same survey procedure was followed during this cruise as during past surveys in this and other areas. Jet-dredge samples were taken at each survey station using a new 48-inch experimental dredge designed to retain all clams exceeding 1.5 inches long. Special features of the new dredge include a retainer compartment for sampling very small size clams, an odometer for measuring the distance traveled by the dredge, and a remote reading thermometer for taking bottom temperatures. A newly designed clam sounder was attached to the dredge but the unit became inoperable during the early part of the cruise and little information was obtained from its use. A water meter was installed in the main feed line to measure the amount of water flowing to the dredge jets from the pump. Readings obtained from the meter showed a maximum flow of 1800 gallons per minute was supplied to the dredge jets at pressures of 70 to 80 pounds per square inch during normal operation.

Survey operations were started on grid line number one (which formed the west boundary of the area) and proceeded from that line seaward and northward to the position where the 1964 survey was terminated. Clam dredge tows were at one-mile intervals along a "grid" of loran lines spaced 1 mile apart. Because of unfavorable bottom conditions, grid line No. 3 and the upper ends of some of the other grid lines were bypassed during the survey.

SURF CLAM CATCHES: Of the 400 stations surveyed during the cruise, 270 of them yielded surf clams varying in abundance from 1 clam to 5.7 bushels per 4-minute tow; 130 tows yielded no surf clams. A total of 34 stations yielded one or more bushels per tow. Many catches of slightly less than one bushel were also made, usually from areas adjacent to the locations of the better catches.

Generally, the inshore and offshore sections of the area surveyed produced the poorest catches of clams while the central section yielded the better catches. The composition of the bottom in much of the inshore area is largely of mud, clay, mud and clay together, or soft silt, with very little sand or gravel. As expected from the results of past surveys, the deeper offshore section produced few large catches. A large portion of the bottom of that section was found to be very hard and very unproductive. It was impossible to get the blade of the dredge to dig more than 2 to 3 inches into the hard bot-

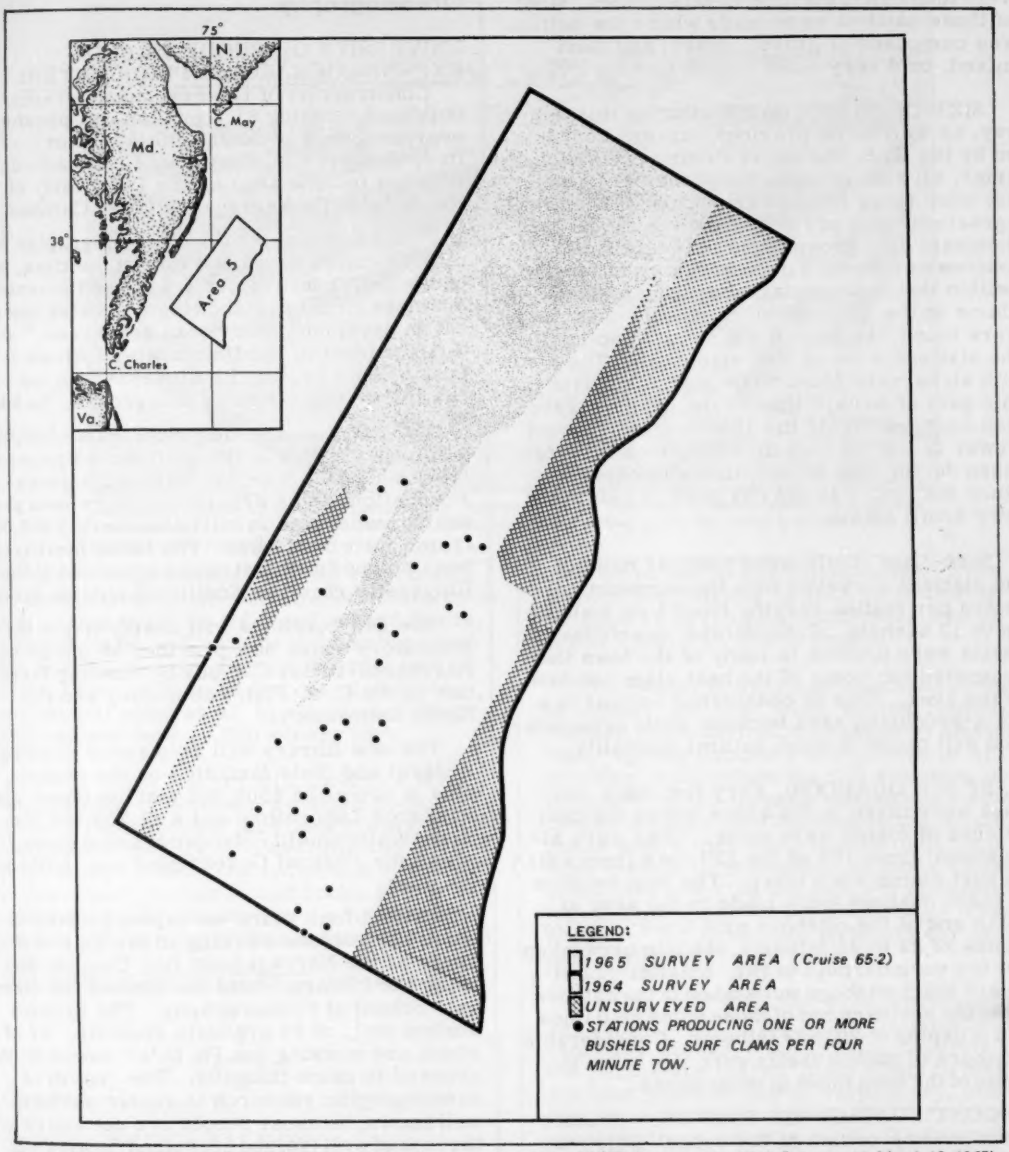


Fig. 2 - Shows survey status of Surf Clam Area 5 and producing stations during M/V Delaware cruise 65-2 (February 19-March 18, 1965).

tom of most of that deeper section. But a few good catches were made in depths of up to 24 fathoms where tows were made on gravel bottoms. It is possible that some surf clams may be found in still deeper offshore waters, if suitable bottom can be found there.

Of the 34 tows made which yielded 1 or more bushels per tow, the 3 best catches occurred where the depth of water was 17 fathoms (102 feet). The depth range for the 34 samples was from 14 to 22 fathoms. The maximum of that range represents the greatest depth where good populations of clams

were found up to the time of this cruise. Most of those catches were made where the bottom was composed of gravel, gravel and sand mixed, or a very coarse sand.

SIZE OF SURF CLAMS: During this survey, as well as on previous surveys conducted by the U. S. Bureau of Commercial Fisheries, all size groups except the very smallest were taken in most of the tows. Also in agreement with previous findings, the predominant size group taken in most of the catches were those 5 inches or more in length (within the commercial size-range). Many clams in the medium-size group (3-5 inches) were taken; the bulk of the catch at some of the stations were of that size clam. The medium sizes were found to be more abundant in this part of Area V than in the northwest section covered during the 1964 summer survey. Fewer of the 1.5-inch or smaller clams were taken during this cruise; this was expected since the gear was not designed to retain the very small clams.

Surf-clam shells were taken at most of the stations surveyed with the numbers collected per station varying from 1 or 2 shells up to 12 bushels. Considerable quantities of shells were present in many of the tows that accounted for some of the best clam catches in the area. This is considered normal in a clam-producing area because shell accumulation will occur through natural mortality.

BLACK QUAHOGS: Very few black quahogs were taken in the areas where the best catches of clams were made. They were also absent from 108 of the 130 tows from which no surf clams were taken. The best catches of black quahogs were made in the area at north end of the offshore grid lines in water depths of 22 to 24 fathoms; the numbers taken per tow varied from 1 to 567. Smaller quantities of black quahogs were taken in the catches from the southern end of those same grid lines and at depths of 20 to 24 fathoms. Considerable numbers of quahog shells were also taken in some of the tows made in those areas.

CONTINUATION OF SURVEY: Another clam survey cruise of the vessel Delaware was scheduled for May-June 1965. A third cruise is planned for October 12 to November 10, 1965.

Note: See Commercial Fisheries Review, November 1964 p. 41.

Oceanography

UNIVERSITY OF RHODE ISLAND EXPANDS OCEANOGRAPHIC CENTER: Construction of two new oceanographic buildings, costing $1.2 million and providing nearly an acre of additional laboratory, office, library, and other space, was scheduled to begin in June 1965 on the University of Rhode Island's Narragansett Bay Campus.

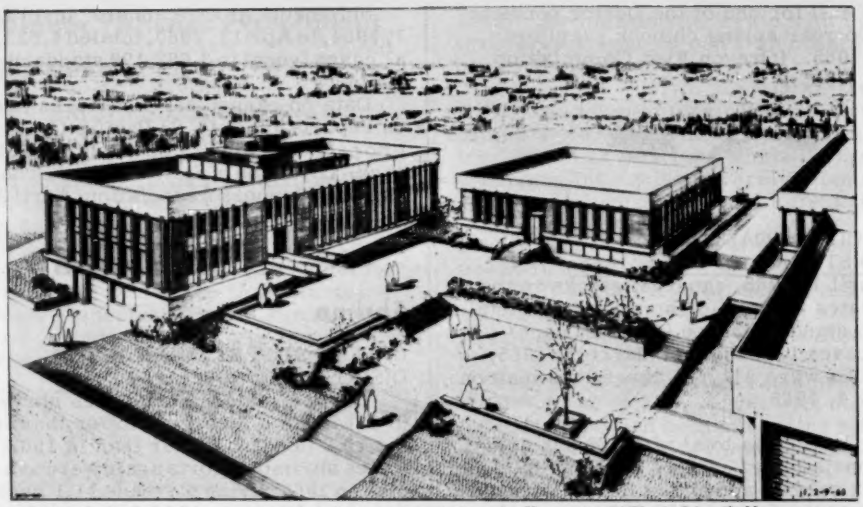
"This expansion of our oceanographic facilities comes at a most opportune time, because the Federal Government and private business firms are showing a greater interest in developing our ocean resources," said the president of the University of Rhode Island. "This region, I believe, is in a unique position to capitalize on this growth," he added.

The new construction includes a $950,000 laboratory-office building, financed primarily with a grant from the National Science Foundation, and a separate library-data processing center, which will be built with $250,000 from a State bond issue. The latter facility has been planned so that it can be expanded if the University receives additional outside funds.

The new buildings will nearly triple the laboratory space now provided at the 88-acre Narragansett Bay Campus by existing facilities in the C. J. Fish Laboratory and the North Laboratory.

The new library will also serve existing Federal and State facilities on the campus, plus a proposed $500,000 Marine Game Fish Research Laboratory and a $1,750,000 National Water Quality Standards Laboratory, which the Federal Government may build in the area.

"Within four years we expect to have at least 400 persons working in the marine sciences at the Narragansett Bay Campus and using the library," said the dean of the Graduate School of Oceanography. The present student body of 49 graduate students--27 of whom are working for Ph. D.'s--would be increased to more than 100. The growth of oceanographic research in recent years is well known, but most people are not aware of the lack of well trained personnel in this field," the dean explained. "However, this lack is generally agreed to be the limiting factor in our national program of expanded oceanographic research. Since the University of Rhode Island is one of only six universities that trains scientists in all aspects of oceanography, I believe our expansion will contribute to help overcome this shortage," he added.



Architect's drawing of two new buildings to be constructed on the University of Rhode Island's Narragansett Bay Campus. On the left is the $950,000 laboratory-office building and in the center is the $250,000 library-data processing center.

The new laboratory building will contain 29 offices and 22 air-conditioned laboratories, distributed over the first and second floors. The basement will include a dressing room for SCUBA divers. Part of the roof will be decked over with wood for out-of-door experimental apparatus. In all, the building will contain over 30,000 square feet.

The 2-story library will include a large lecture hall, conference-seminar rooms, offices, a photographic laboratory, work areas, a computer facility, and drafting and data processing areas. The collection of scientific literature, journals, and books will be a specialized one, devoted to the marine sciences. (University of Rhode Island, April 15, 1965.)

Note: See Commercial Fisheries Review, July 1964 p. 25.

Oregon

SPRING CHINOOK SALMON PLANTINGS INCREASE IN THE WILLAMETTE RIVER:

The Oregon Fish Commission's new multiple-use policy for its Dexter holding ponds yielded an additional 750,000 yearling chinook salmon for planting in the Middle Willamette River in the spring of 1965 (in addition to usual hatchery plantings of 3 million spring chinook in the Middle Willamette). When planted the yearling salmon from Dexter weighed 12 to the pound and measured between 6 and 7 inches in length.

The Dexter facility was originally designed to collect and hold adult spring chinook blocked from upstream passage by Dexter Dam. Spring chinook which arrive in April and May, well before the fall spawning period, move up the fishway immediately below Dexter Dam and are trapped in the holding ponds where they are retained until their eggs mature in September or early October. When they are ripe the fish are spawned by hatcherymen and the fertilized eggs transported to the Willamete Hatchery for incubation and rearing of the fry.

During both 1963 and 1964, spring chinook egg takes at facilities in the Willamette system have exceeded the rearing capacity of the hatcheries there. In an effort to make the best possible use of surplus fry, one of the two adult holding ponds at Dexter was converted to a rearing pond. (Under present operations, only one of the ponds is needed to hold adult fish through the summer.) Use of the pond, which measures 40 by 200 feet, raised Oregon hatchery production of yearling spring chinook on the Middle Willamette by 25 percent from 3 million to 3.75 million during the past season at a relatively low additional cost.

Plans call for one of the Dexter ponds to be used to rear spring chinook yearlings again in 1965. (Oregon Fish Commission, April 15, 1965.)

Salmon

U. S. PACIFIC COAST
CANNED STOCKS, APRIL 1, 1965:

On April 1, 1965, canners' stocks in the United States of Pacific canned salmon totaled 1,435,745 standard cases (48 1-lb. cans), 530,442 cases less than on March 1, 1965, when stocks were 511,774 cases less than on February 1, 1965.

On the basis of a total of 1,726,858 actual cases (consisting of cans of $\frac{1}{4}$-lb., $\frac{1}{2}$-lb., 1-lb., etc.), pink salmon accounted for 49.2 percent (849,663 cases of which 676,562 cases were 1-lb. talls) of the total canners' stocks on April 1, 1965. Next came chum (428,803 cases, mostly 1-lb. talls), followed by red (299,277 cases). The remainder of about 8.6 percent was coho (silver) and king salmon. Nearly 80 percent of the pink salmon stocks on hand was packed in 48 1-lb. cans, and the balance mostly in 48 $\frac{1}{2}$-lb. cans.

Total Canners' Stocks of Pacific Canned Salmon, April 1, 1965

Species	Apr. 1, 1965	Mar. 1, 1965	Feb. 1, 1965
	(No. of Actual Cases)		
King	46,882	63,915	79,834
Red	299,277	411,505	511,299
Coho	102,233	128,589	146,885
Pink	849,663	1,201,716	1,550,541
Chum	428,803	536,529	648,041
Total	1,726,858	2,342,254	2,936,600

From March 1 to April 1, 1965, pink salmon stocks were lower by 352,053 actual cases (1-lb. talls lower by 300,953 cases), reds were down 112,228 cases, and chums were down 107,726 cases.

Carryover stocks at the canners' level totaled 1,175,588 standard cases on July 1, 1964, the approximate opening date of the Pacific salmon packing season. Adding the new season pack of 3,922,356 standard cases brought the total available supply for the 1964/65 season to 5,097,944 standard cases.

Shipments at the canners' level from July 1, 1964, to April 1, 1965, totaled 4,623,018 actual cases (equal to 3,662,199 standard cases).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 98 percent of the 1964 salmon pack. (Division of Statistics and Economics, National Canners Association, April 24, 1965.)

Shrimp

UNITED STATES SUPPLY AND DISPOSITION, 1962-1964:

The available United States shrimp supply in 1964 was 5.6 percent lower than in 1963 but 10.2 percent higher than in 1962. United States shrimp imports again were at a record high in 1964 having increased 1.1 percent from the previous year and 10.9 percent from 1962.

U. S. Supply and Disposition of Shrimp, 1962-1964

Item	1/1964	2/1963	1962
	(1,000 Lbs., Shell-on)		
Supply--Heads-on weight:			
Domestic landings	208,400	240,478	191,105
Foreign product of U.S. fisheries 3/	954	253	479
Imports 4/	269,113	266,205	242,580
Total supply (heads-on)	478,467	506,936	434,164
Disposition--Heads-on weight (approximate):			
Frozen:			
Headless	6/	283,271	253,935
Meat, raw (includes some cooked) 5/	6/	109,703	81,959
Meat, cooked 5/	6/	15,232	15,202
Breaded	91,208	76,700	77,698
Specialties	6/	1,020	1,101
Total frozen 7/	389,632	398,978	342,240
Canned	43,057	68,272	56,522
Sun-dried	4,568	5,640	3,296
Fresh	25,000	27,000	25,000
Unclassified	16,210	7,046	7,106

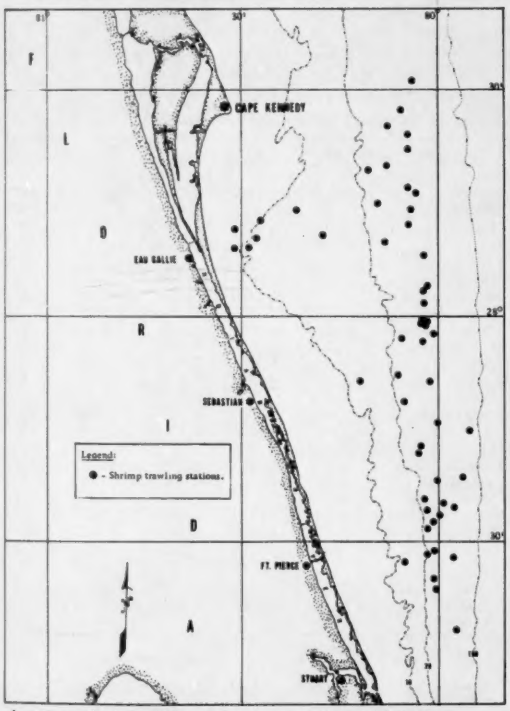
1/Preliminary.
2/Revised.
3/Caught by domestic craft, principally in waters off Central America, and shipped to the United States. Reported by the U.S. Bureau of the Census as "Products of the American Fisheries."
4/The composition of imported shrimp includes estimates for 1962 and 1963. Imports by commodities listed below were converted to heads-on weight by multiplying the quantity of headless shrimp by 1.59, raw meat by 2.04, cooked meat by 3.13, breaded by 1.00, canned by 3.21, dried by 7.69, and unclassified by 1.59.

Item	1964	1963	1962
	(1,000 Lbs.)		
Shrimp:			
Headless	112,149	111,717	108,628
Meat, raw	27,385	29,460	22,703
Meat, cooked	2,585	2,547	1,995
Breaded	508	484	421
Canned	3,004	4,120	2,911
Dried	404	279	56
Unclassified	8,542	2,923	4,469
Total	154,577	151,530	141,183

5/May include some fresh products.
6/Not available.
7/The totals do not add and are less than actual totals because products frozen more than once were eliminated.
Note: To convert the weight of heads-on shrimp to heads-off, divide by 1.59 which will give approximate weight of heads-off shrimp.

South Atlantic Fisheries Explorations and Gear Development

STOCKS OF BROWN SHRIMP OFF FLORIDA'S EAST COAST STUDIED: M/V "Oregon" Cruise 99 (March 8-17, 1965): To obtain more information on the location and catch rates of offshore brown shrimp (Penaeus aztecus) stocks off Florida's east coast between Cape Kennedy and Stuart was the objective of this cruise by the exploratory fishing vessel Oregon of the U. S. Bureau of Commercial Fisheries. Brown shrimp were discovered in that area during a January 1965 cruise of the Oregon.



Area investigated off Florida's east coast during M/V Oregon cruise 99 (March 8-17, 1965).

During this cruise, a total of 61 trawling stations was made in depths of 10 to 70 fathoms using standard 40-foot and 70-foot flat shrimp trawls. The work done on the cruise revealed a wide scattering of the brown shrimp stocks with all catch rates below commercial levels. This was in sharp contrast to the well-defined concentration of shrimp in a depth of 30 to 32 fathoms found in January 1965. The highest catch rate with the 65-foot trawl was 25 pounds of 16-20 count (heads-on) brown shrimp per hour.

Bottom temperature patterns during the cruise were very confused. It appeared that the two weeks of strong winds immediately preceding the cruise severely affected environmental conditions in the fishing area. Bottom temperatures were obtained with a reversing thermometer at 41 locations between 10 and 40 fathoms. These showed a 6° to 10° F. variation at all depths between 22 and 38 fathoms and an apparent break-up of typical depth/temperature stratifications.

Trawlable bottom was found over most of the 10- to 38-fathom range, with scattered patches of broken bottom causing a few tear-ups. A 2-fathom ridge was encountered along the 39-40 fathom depth level.

Small numbers of pink shrimp (P. duorarum) were scattered in catches between 10 and 23 fathoms. Scattered white shrimp (P. setiferus) were found in 10 to 12 fathoms.

Note: See Commercial Fisheries Review, April 1965 p. 36.

Sport Fishing

LICENSE SALES INCREASED IN 1964: A total of 20,219,457 sport fishermen in the United States bought sport fishing licenses in fiscal year 1964 (July-June) as compared with 19,831,644 in fiscal year 1963, the U. S. Interior Department announced on April 21, 1965.

The number of licensed sport fishermen in 1964 was 387,813 more than in the previous fiscal year, and total license expenditures increased by $2,433,168 to a new high of $60,213,427.

State game and fish departments in the 50 States certify the number of their paid hunting and sport-fishing license holders to Interior's Bureau of Sport Fisheries and Wildlife for use as a basis for distributing Federal aid funds for state fish and wildlife restoration projects.

The number of paid license holders is not an accurate measure of the total hunting and fishing public, the Department of the Interior pointed out. In most States, persons younger

Fisherman in large spring near Page Dam, Malheur Refuge, Oregon; casting fishing rod and creel shown.

or older than certain age limits are allowed to hunt or fish without licenses. Also, some States allow landowners to hunt or fish on their own property without a permit and only 6 States require a license to fish in salt water.

Some States require sportsmen to purchase separate licenses, stamps, permits, or tags to fish for different kinds of fish. For example, a special stamp is required in some States to fish for trout.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-April 3, 1965, amounted to 5,631,316 pounds (about 268,158 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was considerably less than the 7,222,255 pounds (about 343,917 standard cases) imported during January 1-March 28, 1964.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty has not been announced; however, in 1964 the quota was 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.

* * * * *

TRENDS IN UNITED STATES IMPORTS OF FISHERY PRODUCTS, 1963:

The value of annual imports of fishery products entering the United States reached a new high in 1963. In that year, United States fishery imports from more than 100 countries rose to a total value (at foreign port of shipment) of $490,708,000. This was an increase of 1 percent or $6 million more than the 1962 imports, and an increase of 44 percent or $93 million over the value of the 1961 fishery products imports. Imports of edible fishery products in 1963 were valued at $394,546,000; inedible fishery products $96,162,000. The value of imported fishery products continued to greatly exceed United States exports of similar products.

Table 1 - Value of U.S. Imports of Fishery Products (Edible and Inedible) by Selected Countries of Origin, 1959-63 1/

Country	1963	1962	1961	1960	1959
	(US$1,000)				
Canada	118,040	116,336	108,035	102,877	101,967
Japan 2/	95,357	107,773	88,263	85,256	96,226
Mexico	59,906	53,529	45,766	36,705	32,869
Peru	35,038	24,818	16,729	14,270	16,374
So. Africa Repbulic	17,270	19,688	14,468	12,030	12,090
Norway	16,778	18,950	15,101	12,506	16,405
Australia	12,520	14,884	10,856	9,839	8,180
Iceland	15,006	11,607	11,528	9,306	10,000
Panama	7,076	7,884	6,707	5,767	6,458
Brazil	6,198	6,827	5,074	3,916	3,002
Denmark	5,412	7,069	5,246	4,342	8,239
Ecuador	5,788	6,443	4,619	4,467	4,159
Portugal	5,533	5,984	6,525	5,289	5,452
India	8,353	5,664	2,777	2,363	2,239
El Salvador	4,303	5,100	5,510	4,215	1,297
West Germany	4,178	5,278	4,160	4,100	1,814
Netherlands	3,460	3,667	1,736	2,562	2,628
France	2,724	2,750	2,087	2,317	2,230
United Kingdom	4,578	3,415	2,309	1,759	2,388
Chile	6,046	4,208	2,089	2,630	1,282
Angola	623	554	500	267	3,023
Cuba	-	98	1,793	3,901	4,810
Other	56,521	52,331	35,180	29,381	23,368
Total	490,708	484,857	397,058	360,065	366,500

1/Value at the foreign port of shipment.
2/Does not include fresh or frozen fish, mostly tuna, transhipped through other countries.

Trend by Countries: Canada, Japan, and Mexico continued to be leading suppliers of fishery products to the United States (table 1). Those 3 countries accounted for 55 percent of the total value of fishery products imports. Canada supplied 24 percent of the total, Japan 19 percent, and Mexico 12 percent. Peru, South Africa Republic, Norway, Iceland, and Australia were the next leading suppliers with imports ranging from $12 to $35 million.

CANADA: Canada, with fishery products valued at $118 million continued to be the principal supplier of fishery products to the United States. Imports from that country in 1963 increased about 1 percent over the preceding year. Leading commodities were as follows:

	1963	1962
	. . . (US$1,000) . . .	
Fresh or Frozen:		
Lobster	16,259	15,000
Fresh-water fish	10,881	11,737
Fish blocks	15,373	15,162
Groundfish fillets	12,481	12,526
Salmon	4,810	5,298
Halibut	6,216	7,791
Flounder fillets	4,594	5,422
Fresh-water fillets	6,441	5,693
Scallops	6,168	4,810
Other fresh or frozen	6,487	5,295
Canned lobster	4,332	5,507
Fish meal and scrap	6,489	5,193
Cod, haddock, etc., pickled or salted	6,815	6,698
Other fishery products	10,694	10,204
Total	118,040	116,336

JAPAN: The value of fishery imports from Japan was $95,357,000 a decrease of 13 percent from 1962. Japan ranked second among United States suppliers of fishery products. Tuna and pearls still remained the leading commodities. United States imports of fishery products from Japan were:

	1963	1962
	. . . (US$1,000) . .	
Fresh or frozen:		
Albacore	9,091	9,759
Albacore loins and discs	861	669
Other tuna	16,020	16,025
Other loins and discs	2,367	3,118
Shrimp	2,443	2,740
Swordfish	4,616	6,232
Fresh-water trout	977	747
Frog legs	1,143	1,362
Oysters	829	213
Halibut and salmon (mainly halibut)	924	1,944
Fish filleted, boned	737	1,161
Canned:		
Light meat tuna in brine	13,712	12,053
White meat tuna in brine	7,383	7,912
Salmon	406	2,238
Crab meat	6,331	4,635
Clams	810	809
Oysters	2,645	2,410
Pearls, cultivated	17,277	17,934
Whale and sperm oil	1,819	3,563
Other	4,966	12,249
Total	95,357	107,773

MEXICO: Mexico ranked third as a supplier of fishery products to the United States. Although the quantity of shrimp received from that country was lower than in 1962, the value of fishery imports from Mexico continued to increase and in 1963 was up 10 percent from the previous year. The value of fishery imports from Mexico was:

	1963	1962
	. . . (US$1,000) . . .	
Shrimp	51,656	46,700
Abalone	3,440	2,512
Lobster	1,012	1,077
Other	3,798	3,240
Total	59,906	53,529

PERU: The marked increase in the value of imports from Peru in 1963 was due to increased shipments of fish meal and scrap which amounted to over $26 million--up 52 percent from the previous year. Imports from Peru of principal fishery products and byproducts were:

	1963	1962
	. (US$1,000) .	
Fish meal and scrap (fertilizer)	884	685
Fish meal and scrap (animal feed)	25,459	16,143
Bonito and yellowtail (canned)	1,531	2,247
Tuna, skipjack, fresh or frozen	2,856	2,219
Tuna, yellowfin, fresh or frozen	1,577	1,721
Other	2,731	1,803
Total	35,038	24,818

ICELAND: Fishery products represent 90 percent of Iceland's total exports. Imports from Iceland to the United States in 1963 amounted to $15,006,000 in 1963--up 29 percent from a year earlier. Fish fillets and blocks accounted for nearly all of the imports from that country.

	1963	1962
	. (US$1,000) .	
Fillets, fresh or frozen	5,009	4,613
Fish blocks and slabs	7,010	5,547
Other	2,987	1,447
Total	15,006	11,607

AUSTRALIA: Australia is rapidly becoming one of the world's leading exporters of high-valued fishery products. The value of United States fishery imports from Australia was $12,520,000 in 1963 and consisted of mostly frozen spiny lobster tails valued at $11,619,000. United States imports from Australia have increased steadily since 1958 but dropped 16 percent in 1963 as compared with the previous year. The value of fishery imports from Australia was:

	1963	1962
	. . (US$1,000) . .	
Spiny lobster tails	11,619	13,867
Other	901	1,017
Total	12,520	14,884

OTHER COUNTRIES: Other leading suppliers of fishery products to the United States market are listed below showing the principal product shipped and the value of United States imports of that product:

	US$1,000
South Africa Republic - Spiny lobster tails	12,754
Panama - Shrimp	6,975
India - Shrimp	6,000
Norway - Canned Sardines (in oil)	5,858
British Guiana - Shrimp	4,668
El Salvador - Shrimp	4,254
Brazil - Spiny lobster tails	3,823
Ecuador - Shrimp	4,374

Area of Origin: During 1963, North American countries continued to be the principal source of supply for

Table 2 - Value of United States Imports of Fishery Products by Area of Origin, 1963 1/

Area	Edible	Inedible	Total
North America	191,014	9,184	200,198
Asia	86,450	30,400	116,850
South America	30,005	38,119	68,124
Europe	50,060	15,581	65,641
Oceania	16,653	328	16,981
Africa	20,364	2,550	22,914
Total	394,546	96,162	490,708

1/Value at the foreign port of shipment.

Table 3 - Value of United States Imports of Fishery Products by Selected Commodities, 1959-63 1/

Commodity	1963	1962	1961	1960	1959
	(US$1,000)				
Edible Products:					
Fresh or frozen:					
Shrimp	101,911	91,898	68,538	56,380	52,306
Tuna	34,962	45,715	30,228	31,713	29,728
Groundfish fillets and blocks	50,328	46,937	42,595	33,265	38,759
Lobster	54,473	57,182	49,039	44,794	38,635
Other	68,300	71,822	63,547	61,845	60,940
Total fresh or frozen	309,974	313,554	253,947	227,997	220,368
Canned:					
Tuna	23,864	22,884	22,175	19,142	21,688
Salmon	605	3,435	3,545	7,541	11,130
Sardines	12,994	16,291	12,543	9,115	8,370
Crab meat	6,370	4,701	5,780	5,514	7,947
Lobster	4,818	5,811	4,779	5,239	6,441
Other	19,444	18,878	17,530	16,067	17,083
Total canned	68,095	72,000	66,352	62,618	72,659
Other edible products	16,477	15,328	15,458	16,765	18,006
Total edible products	394,546	400,882	335,757	307,380	311,033
Inedible products:					
Fish meal	37,039	24,298	16,740	11,068	15,884
Pearls	17,906	18,935	16,925	14,563	13,678
Other	41,217	40,742	27,636	27,054	25,905
Total inedible products	96,162	83,975	61,301	52,685	55,467
Total fishery imports	490,708	484,857	397,058	360,065	366,500

1/Value at the foreign port of shipment.

fishery products imported into the United States. Imports from Asia and South America ranked in second and third place.

Foreign trade plays a significant role in the economics of the United States fishing industry. In 1963, imports accounted for 56 percent of the total United States supply of fish and fish products. In a review of world import trade, data compiled for 1961 by the Food and Agriculture Organization (FAO) confirmed that the United States ranked as the world's leading importer of fishery products. According to FAO data, the United States bought more than twice as much fishery products as any other country. The United Kingdom ranked second and West Germany ranked third as importers of fishery products. United States imports of fishery products also surpassed fishery imports by the European Common Market when the imports of its member countries were considered as a unit.

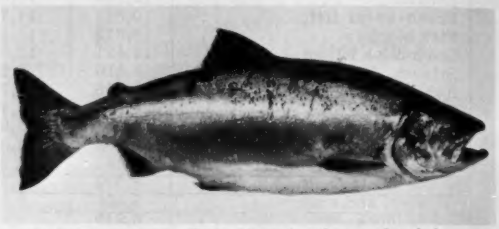
Note: See Commercial Fisheries Review, February 1964 p. 56.

Washington

SALMON OUTLOOK IN PUGET SOUND ANNOUNCED AS NET FISHING REGULATIONS ARE SET FOR 1965:

The 1965 salmon runs to Puget Sound in Washington should include a good pink salmon run (but not as good as in 1963), a better than average run of king (chinook) salmon, a good run of silver (coho), and a better sockeye run than in 1963. But a poor run of chum salmon is expected. Those predictions were announced during public hearings in March 1965 when state regulations were adopted for the 1965 net fisheries for salmon in Puget Sound.

The 1965 Puget Sound net regulations are designed to generally allow open seasons of 4 to 5 days a week for king salmon, 2 days a week for sockeye, 3 days a week for pink, 4 days a week for silver, and 2 to 4 days a week for chum salmon.



Pink or humpback salmon (Oncorhynchus gorbuscha).

Commercial net fishing for salmon in most areas of Puget Sound will begin either June 12 or June 28 and run until November 30, 1965. (An early season during part of May will be allowed in a few areas.) Weekly closed periods will vary from area to area. There are 11 salmon fishing areas in Puget Sound and the Strait of Juan de Fuca. (Washington State Department of Fisheries, March 29, 1965.)

* * * * *

SALMON FARM OPERATED IN COOPERATION WITH SPORT FISHING CLUB:

Grays Harbor on the Washington coast is the site of a cooperative salmon-rearing effort by the Washington Department of Fisheries and a local sport fishing club. The project began in 1964 when 50,160 king (chinook) salmon fry were planted in the Campbell Slough of Grays Harbor. The fish, which had been previously reared at the Simpson Hatchery, averaged 284 a pound and about 2 inches in length when planted. By June 16, 1964, the Campbell Slough salmon fry taken in test seines averaged 71 to the pound. That indicated good growth, and survival appeared quite high. In late June 1964, stop-logs were removed from the outlet structure and the young salmon were allowed to migrate into Grays Harbor and begin their ocean journey.

Adult fish will be returning from that plant in 1966 and 1967 to contribute to the various sport and commercial fisheries in Grays Harbor and the Pacific Ocean.

The Campbell Slough salmon farm is operated by the Washington State Fisheries Department in cooperation with the Grays Harbor Poggie Club and certain property owners. The Poggie Club purchased neces-

sary materials for the Slough's outlet structure, which was installed by the Fisheries Department.

The slough was treated with chemicals January 27, 1965, to rid it of scrapfish that would compete for food with the young chinook and also gobble up the small, growing salmon. Another salmon plant of 75,000 king salmon fry was introduced into Campbell Slough on March 16, 1965. (Washington State Department of Fisheries, April 8, 1965.)

Wholesale Prices

EDIBLE FISH AND SHELLFISH, APRIL 1965:

Prices in April 1965 were up 0.5 percent from the lower seasonal level of the previous month. A further decline from March to April in prices for several fresh fish items was offset by higher prices for a number of the major frozen fishery products (mostly because of declining cold-storage stocks) and sharply higher prices for fresh-water fish during the Jewish Holidays. As compared with April 1964, the overall index this April was up 5.5 percent because of substantially higher prices for frozen halibut, Great Lakes fish, and moderately higher prices for ex-vessel haddock.

In the subgroup for drawn, dressed, or whole finfish, ex-vessel prices at Boston for large haddock this April dropped 20.5 percent from the previous month because of the seasonal increase in landings. But prices for other items in the subgroup were higher than in March. At New York City, prices for western frozen halibut were up 2.1 percent due to lower warehouse stocks. During the Jewish Holidays in April, prices were up sharply at New York City for Great Lakes round yellow pike (up 17.6 percent) and at Chicago for fresh Lake Superior whitefish (up 36.0 percent). From March to April 1965 the subgroup index was up 0.2 percent but was 12.8 percent higher than in April 1964 because of substantially higher prices this April for frozen halibut and Great Lakes fish.

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, April 1965 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			April 1965	Mar. 1965	April 1965	Mar. 1965	Feb. 1965	April 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					108.8	108.3	109.7	103.1
Fresh & Frozen Fishery Products:					113.3	112.5	114.5	103.7
Drawn, Dressed, or Whole Finfish:					111.0	110.8	115.1	98.4
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.09	.11	69.5	87.4	99.2	67.4
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.41	.40	119.8	117.3	117.3	82.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.83	.83	115.3	115.3	118.8	116.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.85	.63	126.9	93.3	96.3	84.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	1.00	.85	163.7	139.2	131.0	69.8
Processed, Fresh (Fish & Shellfish):					114.5	112.3	115.1	115.0
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.35	.40	85.0	97.1	105.6	75.3
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.00	.95	117.2	111.3	113.7	111.3
Oysters, shucked, standards	Norfolk	gal.	6.88	6.88	115.9	115.9	118.0	126.5
Processed, Frozen (Fish & Shellfish):					109.5	109.3	108.6	94.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.37	.38	93.8	95.0	88.7	93.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.37	.39	108.5	112.9	114.3	107.0
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.31	105.2	108.7	108.7	108.7
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.94	.92	111.5	108.5	107.9	86.8
Canned Fishery Products:					101.2	101.3	101.8	102.5
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	20.25	20.50	88.3	89.3	91.5	96.9
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.44	11.44	101.6	101.6	102.6	103.3
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	105.9	103.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.00	131.5	128.3	128.3	116.5

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

The newer of two wholesale market buildings in the New York City Fulton Fish Market as it looked in 1940. There are plans to relocate the market.

Higher prices for fresh South Atlantic shrimp at New York City (up 5.3 percent) in April 1965 offset a fairly substantial price drop at Boston for fresh small haddock fillets (down 12.5 percent). As a result, the subgroup price index for processed fresh fish and shellfish rose 2.0 percent from March to April but was 0.4 percent lower than in April 1964 because of lower prices at Norfolk for shucked standard oysters.

The April 1965 subgroup index for processed frozen fish and shellfish rose only slightly from the previous month (up 0.2 percent). Prices were lower than in March for all items in the subgroup except frozen shrimp which rose 2.8 percent from March to April. As compared with April 1964, the index this April was 15.6 percent higher mainly because of a much stronger shrimp market and slightly higher prices for frozen haddock fillets (up 1.4 percent).

Market conditions for canned fishery products were mostly steady during April 1965. Prices for canned pink salmon were down only slightly from the previous month and movement of stocks continued at a good pace. Very low stocks of canned Maine sardines before the start of the new packing season were responsible for a 2.5-percent price increase from March to April and prices were 12.9 percent higher than in April 1964. As compared with the same month a year earlier, the canned fishery products subgroup index this April was down 1.3 percent as a result of lower prices for canned tuna and canned pink salmon.

SHARK REPELLENTS TESTED

A number of experiments to test the effect of repellents on sharks have been carried out by the U. S. Bureau of Commercial Fisheries Tuna Resources Laboratory, La Jolla, Calif., as a part of its tuna behavior program. Sharks associated with tuna are responsible for serious economic losses to commercial fishermen both because of damage to the nets and to the fish within the nets. During the experiments, sharks were attracted to the vessel by chumming, and repellents were then tested on the feeding sharks.

Repellents tested included commercial "Shark Chaser," nigroscein dye, fluorescein dye, and copper sulfate. In addition, the repelling effect of sound was tested with a "white noise" emitter designed by a United States East Coast firm. None of the repellents was found to be effective. Copper sulfate may have slowed the feeding frequency somewhat but did not stop it. The use of the mini-sub--a two-man, free-flooding submersible--and a special aluminum shark cage developed by a Bureau scientist made possible the documentation of the tests with some remarkable underwater motion pictures.

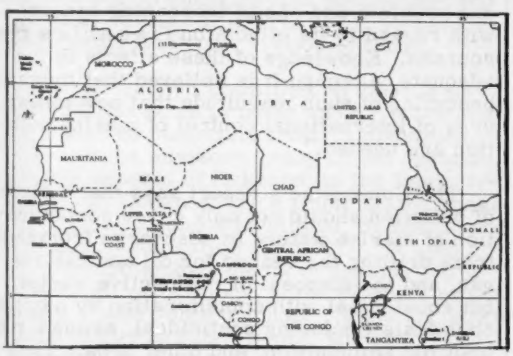
FOREIGN

International

AFRICA

FRENCH-SPEAKING NATIONS DISCUSS ADMINISTRATION AND PLANNING FOR AFRICAN FISHERIES DEVELOPMENT:

A seminar on Administration and Planning for Fisheries Development, to which French-speaking countries of Africa were invited, was held at Abidjan, Ivory Coast, March 8-27, 1965. The seminar was sponsored by the Food and Agriculture Organization (FAO) and the chairman was the Chief of the Marine Fisheries section of the Ivory Coast Fisheries Service. In addition to Ivory Coast, other participating African nations were Morocco, Senegal, Upper Volta, Mali, Dahomey, Cameroon, Gabon, Congo-Brazzaville, Chad, and Burundi.



The conference was called and conducted as a seminar for the exchange of ideas and information toward the overall joint aim of the African fisheries. All of the participating nations were represented, in most cases, by each country's Fisheries Service Chief but no formal action was taken because the participants were not accredited as officially representing their countries.

Discussions at the seminar included a fairly wide range of discussions, and a report of the fisheries situation in his country was given by each of the African participants. A consensus of views on certain points, as noted in the Draft Conference report, included: (1) a recognition of the need for conservation measures; (2) a recommendation for intensified development of fresh-water fisheries, including artificial impoundments; (3) a recognition of the value of intercountry training in fisheries; (4) a recommendation for more emphasis on modern industrial methods of fishing rather than the traditional methods; (5) a realization of the need for knowledge of resources, market potential, and effect on the national economy in planning fisheries development; (6) a recognition of the need for adequate training of fisheries personnel either within each country or at regional training facilities; (7) a realization of the importance of establishing a feeling of confidence in and cooperation with the fisheries service on the part of the fishing industry; (8) a recognition of the need for international fishery commissions for research and conservation; and (9) a hope that the Regional Fisheries Commission for West Africa will become more active. (Regional Fisheries Attache, United States Embassy, Abidjan, April 3, 1965.)

EUROPEAN ECONOMIC COMMUNITY

IMPORT QUOTAS SET FOR SELECTED FISHERY PRODUCTS IMPORTED BY WEST GERMANY AND BELGIUM-LUXEMBOURG:

On March 29 and 30, 1965, the Commission for the European Economic Community (EEC) announced decisions granting tariff quotas to West Germany and Belgium-Luxembourg for selected fishery products during various periods in the fiscal year ending March 31, 1966.

Under those quotas, West Germany will be able to import fresh and frozen fishery products as follows:

Herring (Clupea harengus) and sprat (Clupea sprattus): 85,000 metric tons duty-free between June 16, 1965, and February 14, 1966.

International (Contd.):

Dogfish shark (Squalus acanthias): 3,000 tons at 3-percent duty between April 1, 1965, and March 31, 1966.

Cod, pollock, haddock, and "black" halibut: 10,500 tons between August 1 and December 31, 1965. "Black" halibut will be subject to an import duty of 2.2 percent, but other items under that quota enter duty-free.

West Germany was also granted an import quota for 1,300 tons of salted pollock (for canning) at 7-percent duty between April 1, 1965, and March 31, 1966.

Belgium-Luxembourg was granted an import quota for 90 tons of certain crab and shrimp (destined for canning) at 3-percent duty between April 1, 1965, and March 31, 1966. (United States Mission to the EEC, Brussels, April 14, 1965.)

FISH MEAL

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January 1965

Country	January		Jan.-Dec.	
	1965	1964	1964	1963
	. . . .(1,000 Metric Tons). . . .			
Chile	9.0	11.8	137.8	86.8
Angola	1/	4.8	56.0	30.0
Iceland	9.6	11.5	124.3	99.1
Norway	13.2	27.2	179.4	104.1
Peru	164.9	101.9	1,416.5	1,159.7
So. Africa (including S.-W. Africa)	11.3	13.4	226.5	199.0
Total	208.0	170.6	2,140.5	1,678.7

The FEO countries produced 2.3 million metric tons of fish meal in 1964 or about 70 percent of total world production estimated at 3.3 million tons.

Fish meal exports by FEO countries in January 1965 totaled 208,000 tons, an increase of about 22 percent from the same month of the previous year. Peru accounted for about

Table 2 - Production of Fish Meal by Member Countries of the FEO, January 1965

Country	January		Jan.-Dec.	
	1965	1964	1964	1963
	. . . .(1,000 Metric Tons). . . .			
Chile	12.9	21.8	147.0	92.7
Angola	1/	5.6	59.7	31.5
Iceland	4.2	5.7	127.7	87.7
Norway	5.9	8.7	185.9	132.2
Peru	194.1	195.5	1,552.3	1,159.2
So. Africa (including S.-W. Africa)	8.7	14.0	257.4	238.0
Total	1/ 225.8	251.3	2,330.0	1,741.3

1/Data not available.

79 percent of total fish meal exports reported by FEO countries in January 1965.

FOOD AND AGRICULTURE ORGANIZATION

ADVISORY COMMITTEE ON MARINE RESOURCES RESEARCH MEETS IN ROME:

The increasing pollution of the world's marine fishing waters must be combated, fisheries scientists agreed at the annual meeting of the Advisory Committee on Marine Resources Research, Food and Agriculture Organization (FAO), held in Rome, March 1-8, 1965. In its final report the Committee says, ". . . marine pollution is, in certain areas, becoming a serious problem and one of increasing concern with regard to its effects on fisheries resources. Knowledge of these effects is inadequate, although it is believed that they are becoming of such magnitude that new measures of international control of marine pollution are needed."

The Committee's report says that a study of pollution should not only cover contamination of marine waters by discharge from ships, from drilling the seabed for oil and natural gas, and the disposal of radioactive wastes, but should deal with contamination by noxious chemicals (including pesticides), sewage, rubbish, old ammunition, and other urban, industrial, and agricultural wastes. The report also says there is an urgent need for greater scientific knowledge of the living resources of the sea if man is to harvest them to his best long-term advantage. The rapid growth of modern fishing operations may lead to the damaging depletion of some fish stocks before research has revealed the limits of their safe annual yield, the report continued.

The Advisory Committee also discussed the possible future use of new and speedier

International (Contd.):

ways of mapping fish abundance, including the use of underwater television and echo-sounding equipment, sometimes combined with aerial surveys.

The Committee urged the speedy strengthening of present regional fisheries bodies and, where necessary, the establishment of new ones. A case in point was the proposed Atlantic Tuna Commission. Their report says that "while the lengthy national and international procedures are being followed, tuna fishing in the Atlantic continues to develop rapidly, in the absence of any adequate international effort to organize the collection of biological statistics and undertake the urgently-needed studies of the biology and state of tuna stocks in the area."

The Committee report also noted proposals made earlier by FAO's Director-General: (1) the establishment of a permanent committee composed of senior fisheries officials of selected FAO member nations, (2) the launching of a world program of marine resources research, and (3) it endorsed a major strengthening of FAO's work in fisheries. The Committee recommended that more studies be carried out on changing fish populations and the improvement of international cooperation in the study and conservation of these.

The Advisory Committee on Marine Resources Research is made up of 15 outstanding fisheries scientists from 11 countries. It also is the advisory group on the oceanographic aspects of fisheries to the Intergovernmental Oceanographic Commission under the United Nations Educational, Scientific and Cultural Organization (UNESCO). It also advises on fisheries aspects of several big international expeditions, some of which are in progress and some planned. (Food and Agriculture Organization, Rome, March 9, 1965.)

Note: See Commercial Fisheries Review, April 1964 p. 42.

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WORLD FISHERY TRADE IN 1963:

The value of international trade in fish and fishery products reached an all-time high of at least US$1,686 million in 1963, the latest year for which world fishery statistics are available, according to the 1963 Yearbook of Fishery Statistics (Vol. 17), published by the Food and Agriculture Organization (FAO). The Yearbook shows the 1963 value to be $89 million above the previous high of $1,597 million reported for 1962.

About one-third of the 1963 record world fishery catch of 46.4 million metric tons crossed at least one international border between the time the fish were caught and when they were placed before the housewife. The 15.2 million tons of fishery products going into international trade represented the live weight as they came out of the water and not the final weight of the products--fresh, frozen, or otherwise processed--as sold to the public.

The FAO Yearbook data include trade statistics for the Union of Soviet Socialist Republics. They do not include trade data for Mainland China, for which fishery catch estimates are based entirely on outside information. The Yearbook's data are based on fishery statistics reported to FAO by 140 countries which accounted for 41 million tons, or 88 percent of the 1963 world catch. About 37 percent of the total catch of those countries went into international trade.

The new FAO publication gives the disposition of the 1963 fishery catch whether sold at home or abroad, such as: marketed fresh 16.4 million tons; frozen 4.7 million tons; cured as smoked, dried, and salted fish 8.3 million tons; canned 4 million tons; for processing into fish meal meal or oil 12 million tons; used for other purposes ranging from fish sticks to fertilizer 1 million tons.

The percentage of the world fishery catch going into international trade has risen steadily since the end of World War II; in 1958 it was 29 percent and in 1948, when FAO began compiling world fishery statistics, it was about 19 percent.

In 1963 there were 19 nations which caught 500,000 or more tons of fish. The top 5 nation's were Peru (6,901,300 tons); Japan (6,697,800); Mainland China (5 million); the U.S.S.R. (3,977,200); and the United States (2,711,900). (Food and Agriculture Oranization, Rome, March 21, 1965.)

INTER-AMERICAN TROPICAL TUNA COMMISSION

ANNUAL MEETING:

A quota of 81,800 tons for the catch of yellowfin tuna in the eastern Pacific for 1965 was recommended by the Inter-American Tropical Tuna Commission at its 17th Annual Meeting in Mexico City, Mexico, March 23-26, 1965. This will restore the resource in about 4 years to

International (Contd.):

a level which will produce the maximum sustainable annual yield of 91,500 tons. The member nations, Costa Rica, Ecuador, Mexico, Panama, and the United States, also pledged themselves to do everything legally possible to induce other nations which fish in the area to cooperate in the regulatory program.

Other nations which fish tuna in the eastern Pacific are Peru, Japan, Chile, and Colombia. The average catch of yellowfin tuna in the eastern Pacific in the four-year period ending with 1964 was 93,991 tons, shared by the member and nonmember nations as follows:

Country	Average Catch Yellowfin Tuna 1961-1964	Percentage of Average Total Catch
	Short Tons	%
United States	77,124	82.0
Peru	8,965	9.5
Japan	4,127	4.3
Mexico	2,051	2.2
Ecuador	975	1.3
Costa Rica	333	0.3
Chile	283	0.3
Colombia	133	0.1
Panama	0	0.0

All the countries, with the exception of Peru and Chile, have pledged themselves to put regulations into effect when this becomes necessary. If the regulatory program is to be effective, however, all countries which fish yellowfin tuna in the regulatory area must cooperate. Peru and Chile so far have refused to cooperate under conditions acceptable to most member nations of the Tuna Commission. Hence, although the Commission has recommended regulation of the fishery each year since 1962, the fishery has not been controlled.

The United States Delegation at the meeting consisted of Commissioners J. L. McHugh (Head of the Delegation), Washington, D. C., Robert L. Jones of Gearhart, Oreg., and John G. Driscoll, Jr., of San Diego, Calif.; Advisers William C. Herrington and Fred E. Taylor of the U. S. Department of State; Donald R. Johnson, Regional Director, U. S. Bureau of Commercial Fisheries, Terminal Island, Calif.; Richard Croker, Fishery Attache, U. S. Embassy, Mexico City, Mexico; Philip M. Roedel, Director, California State Fisheries Laboratory, Terminal Island; and the following representatives of the tuna industry: Lester Balinger, John Calise, Charles Carry, Clifton Day, August Felando, Anthony Nizetich, John Royal, and George Steele.

INTERGOVERNMENTAL MEETING ON REGULATION OF TUNA FISHERIES IN EASTERN PACIFIC:

The Intergovernmental meeting on March 25 and 26, 1965, was attended by Delegates or Observers from the nine nations already mentioned, plus Canada, El Salvador, Guatemala, Honduras, and Nicaragua. The United States Delegation at the meeting consisted of William C. Herrington (Head of the Delegation) and William M. Terry of the Office of the Commissioner of Fish and Wildlife, with the members of the Tuna Commission delegation as advisers. The principal purpose was to reach agreement on a cooperative scheme for effective control of the yellowfin fishery. Peru and Chile, however, required subquotas of 12,000 tons and 5,000 tons, respectively, as the price of cooperation. This was not acceptable to most of the other voting nations, and no agreement was reached on this point. It was agreed, however, that the member nations of the Inter-American Tropical Tuna Commission would meet again soon to develop methods to obtain the cooperation of other countries.

Note: See Commercial Fisheries Review, May 1964 p. 42.

NORTHWEST PACIFIC FISHERIES COMMISSION

PROGRESS OF JAPAN-U.S.S.R. FISHERIES NEGOTIATIONS:

The Ninth Annual Meeting of the International Northwest Pacific Fisheries Commission convened at Tokyo, on March 2, 1965. On March 5, the Scientific Subcommittee of the Commission began evaluating the condition of salmon resources.

The Subcommittee arrived at the conclusion that the 1965 chum, silver, and king salmon run would be at about the same level as in 1964 and that the 1965 pink run would be at a level comparable to the 1963 run and well above the 1964 run. The Subcommittee acknowledged that the Asian red salmon resource had declined greatly but was not able to reach agreement as to the cause of that decline. The Soviet Union claimed overfishing by Japanese vessels to be the primary cause, while Japan claimed the decline may have its origin in natural oceanic conditions.

The Soviet Union's red salmon catch for the past four years was reported to be: 1961--7,834 metric tons; 1962--4,649 tons; 1963--3,443 tons; and 1964--2,692 tons. The 1964 red salmon run to the Ozernaya River, which

International (Contd.):

contributes 70-80 percent of the total Asian run, was reported to be disastrous. Although Japan and the Soviet Union were not able to agree as to whether the 1965 Ozernaya run would be above or below the 1964 level, they were in general agreement that the depletion was serious.

At the plenary session on March 18 the Soviet Union was reported to have proposed that Japan should reduce her salmon fleet in Area B (south of 45° N. latitude) by over 50 percent and, at the same time, expand the closed areas and shorten the fishing season in that area. Japan is said to have rejected the Soviet proposal. (Suisan Keizai Shimbun, March 19 & 24; Suisan Tsushin, March 11, 1965; and other sources.)

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JAPANESE SALMON CATCH QUOTA FOR 1965 IN WESTERN PACIFIC:

Agreement on a 1965 Japanese salmon catch quota of 115,000 metric tons in the western Pacific (off the coasts of Japan and the U.S.S.R.) was reached March 31, 1965, at the ninth annual meeting of the Northwest Pacific Fisheries Commission (Japan-U.S.S.R.).

The 1965 Japanese salmon quota in the western Pacific provides for a catch of 56,000 tons in Area A (north of 45° N. latitude) and 59,000 tons in Area B (south of 45° N. latitude). That is an increase over the 1964 quota of 1,000 tons in Area A and 4,000 tons in Area B. Other regulations were unchanged from 1964.

The Japanese red salmon catch target for Area A was set at 7.75 million fish of which not more than 2.5 million are to be taken west of 165° E. longitude.

The Japanese press reported mixed reactions in the fishing industry. A spokesman for the Japanese Salmon Drift-Net Association (land-based fishery) expressed dissatisfaction that Japan's request for a 120,000-ton quota was not obtained.

On the other hand, the president of the Japanese Fishery Association said that although the agreement does not satisfy all segments of the salmon industry, he hailed the outcome of negotiations as setting a good precedent and offering bright prospects for future negotiations. (United States Embassy, Tokyo, March 31, 1965.)

(Note: The Northwest Pacific Fisheries Commission on March 24, 1965, agreed on a 1965 king crab catch quota in the western Pacific of 240,000 cases (48 ½-lb. cans) for Japan and 420,000 cases for the U.S.S.R.)

Note: See Commercial Fisheries Review, May 1965 p. 53; Mar. 1965 p. 83, Jan 1965 p. 78, July 1964 p. 42.

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JAPANESE-SOVIET NEGOTIATORS SET KING CRAB CATCH QUOTA FOR 1965 IN WESTERN PACIFIC:

On March 24, 1965, an informal agreement on king crab quotas was reached by Japan and the U.S.S.R. at the ninth annual meeting of the Northwest Pacific Fisheries Commission. Japan's 1965 king crab catch quota was set at 240,000 cases (48 ½-lb. cans), a reduction of 12,000 cases from the previous year. The Soviet quota for 1965 was increased to 420,000 cases, or 42,000 cases above the 1964 quota. The new annual king crab quotas are to apply in both 1965 and 1966. The U.S.S.R. plans to operate 7 motherships in the king crab fishery in 1965 as compared to 6 in 1964. There will be no change in size in the Japanese fleet of 4 king crab motherships.

The Northwest Pacific Fisheries Commission sets salmon and king crab catch quotas for waters in the Sea of Okhotsk and in the Bering Sea off Kamchatka. (United States Embassy, Tokyo, March 25, 1965.)

Note: See Commercial Fisheries Review, Mar. 1965 p. 83; Jan. 1965 p. 78; July 1964 p. 42.

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JAPANESE-SOVIET NEGOTIATORS AGREE ON JOINT INSPECTION OF SALMON FISHERY IN NORTHWEST PACIFIC AREA B:

On March 27, 1965, at the ninth annual meeting of the Northwest Pacific Fisheries Commission, informal agreement was reached between the U.S.S.R. and Japan on supervision of the Japanese salmon fishery in Area B (south of 45° N. latitude) along the following lines: (1) Regulations to be jointly enforced by Japanese and Soviet inspectors aboard Japanese patrol vessels only; (2) Japanese to increase number of patrol vessels from 4 operated in 1964 to 5 during current season; (3) one Soviet inspector with interpreter to board each Japanese patrol vessel; (4) joint enforce-

International (Contd.):

ment expanded to cover Japan sea area of Convention waters. (United States Embassy, Tokyo, March 30, 1965.)

NORTH ATLANTIC OCEAN

FISHERY CATCH AT RECORD HIGH IN 1963:

A record 10.7 million metric tons of fish were caught in the North Atlantic Ocean in 1963, according to the Food and Agriculture Organization (FAO). The 1963 catch was 510,000 tons above the previous high of 10.2 million tons in 1962, and accounted for just under one-quarter of the record 1963 world fishery catch of 46.4 million tons.

Leading the nations taking a part, or all, of their 1963 catches from the North Atlantic, was the Soviet Union with 1,679,093 tons. The Soviet total 1963 catch from all fishing areas was 3,977,200 tons. Norway was in second place with 1,330,979 tons. Practically all of Norway's total 1963 catch of nearly 1,387,800 tons came from North Atlantic waters. All other nations fishing the North Atlantic took less than a million tons from it.

Nations catching 500,000 or more tons were Denmark (including Faroe Islands) with 975,730 tons; the United Kingdom 944,266; Spain 810,811; Canada 801,184; Iceland 783,235; the Federal Republic of Germany 636,346; and France 546,002 tons. North Atlantic catches by other nations in 1963 included Portugal with 485,489 tons; United States 464,560; Netherlands 350,310; Sweden 339,798; Poland 198,682; East Germany 177,203; Belgium 61,901; Finland 60,954; Greenland 33,290; and Ireland 27,642. (Food and Agriculture Organization, Rome, March 10, 1965.)

SOVIET-NORWEGIAN TALKS ON FISHERIES

Norway and the Soviet Union announced that they would urge international measures to protect the cod stocks in the Barents Sea, now subjected to heavy exploitation. With a view to reaching a speedy solution, the Fisheries Ministers of the two countries agreed that such measures should be discussed at the 3rd session of the Commission on North Atlantic Fisheries, which was to be held at Moscow in May 1965.

During the Soviet Minister's 12-day visit in Norway during March, the two officials also discussed other questions, including mandatory increase of the mesh size in trawls and nets, ban on protective nets, and regulation of the catch intensity. They welcomed in principle a British proposal for a conference of experts to draft regulations that would ensure maintenance of order on fishing grounds in international waters.

The Fisheries Ministers of both countries stressed the importance of continued cooperation between Norwegian and Soviet oceanographers to strengthen fishery research in the Northeast Atlantic.

The communique said the Norwegian Fisheries Minister has accepted an invitation to pay an official visit to the Soviet Union at a future date. (News of Norway, March 25, 1965, Norwegian Information Service, Washington, D. C.)

LAW OF THE SEA

CERTAIN INTERNATIONAL CONVENTIONS RATIFIED BY FINLAND:

On February 16, 1965, the Government of Finland deposited its ratification of the four Law of the Sea Conventions: The Convention on the Territorial Sea and Contiguous Zone; the Convention on the High Seas; the Convention on the Continental Shelf; and the Convention on Fishing and Conservation of the Living Resources of the High Seas.

Finland's ratification of the Convention on Fishing and Conservation brings the total number of ratifying countries to 18. A total of 22 ratifications are needed before the Convention enters into force. The other three Conventions have already entered into force.

The Conventions ratified by Finland were formulated at the United Nations Conference on the Law of the Sea at Geneva on April 29, 1958.

Note: See Commercial Fisheries Review, Mar. 1965 p. 83; Jan. 1965 p. 59; Dec. 1964 p. 39; Nov. 1964 p. 70; Oct. 1964 p. 49.

WHALING

ANTARCTIC CATCH FALLS SHORT OF QUOTA IN 1964/65 SEASON:

Total Antarctic whale production of the three whaling nations (Japan, Soviet Union, and Norway) during the 1964/65 season amounted to 6,984 blue-whale units, according to data released by the International Whaling Commission. Their total catch not only failed to reach the international catch target of 8,000

International (Contd.):

blue-whale units but marked a record low, falling far below the 8,428 units harvested in 1963/64 and 11,299 units in 1962/63.

Fig. 1 - Gunner aboard a Japanese whale-hunting vessel shoots harpoon into whale (upper right corner).

The seven Japanese whaling fleets participating in the 19th Antarctic Whaling Expedition (1964/65) had almost reached their quota when the Antarctic season closed April 7, 1965. The combined catch of the seven Japanese fleets totaled 4,125 blue-whale units, only 35 units short of Japan's international whale catch quota of 4,160 blue-whale units. (Suisan Keizai Shimbun, April 9 & 13, 1965.)

Fig. 2 - Cutting up whale aboard a Japanese whaling mothership in Antarctic.

According to newspaper reports in Oslo, Norway, the Soviet Antarctic catch in 1964/65 of 1,586 blue-whale units was also very close to its quota of 1,600 units. But Norway's Antarctic catch in 1964/65 of 1,273 blue-whale units was far below its quota of 2,240 units. The Norwegian newspapers mentioned Norway's aging whaling fleet as a factor in the poor catch. The four Norwegian expeditions caught 5,535 sei whales and 702 fin whales in the 1964/65 Antarctic season, as compared with 2,097 fin whales and 2,617 sei whales in the previous season. (United States Embassy, Oslo, April 14, 1965.)

Note: For details on Norwegian whale oil production see page 69 of this issue.

Angola

FISH MEAL INDUSTRY MODERNIZATION PROGRAM AIDED BY GOVERNMENT LOAN:

According to Angola newspaper reports, a contract was signed February 18, 1965, for a loan of 15,000 contos (about US$500,000) by the Portuguese Development Bank to the Fishing Industries Institute of Angola. The loan will help finance a project to modernize Angola's fish meal industry. Total cost of the project is said to be 40,000 contos ($1.4 million), part of which will be provided by the Government Fund for the Support of the Fishing Industry.

At the signing of the loan contract, the Director of the Fishing Industries Institute of Angola said the modernization project includes plans to: (1) equip fish meal factories with modern equipment to extract fish oil; (2) equip them with fuel oil rather than wood burners; (3) install power blocks on purse-seine vessels; (4) equip isolated fish processors with small fish-meal units and, generally, to provide the financial means for full utilization of fish waste throughout the industry; (5) replace obsolete equipment in certain fish-meal factories; and (6) install a fish-processing plant in Porto Alexandre to replace the existing ones which do not meet minimum standards.

Emphasis appears to be on government support for modernization of present installations rather than for promotion of new processing plants. That is in line with the expressed thinking of the Fishing Institute Director that private industry must provide the

Angola (Contd.):

large sums needed to expand the processing industry. (United States Consulate, Luanda, March 3, 1965.)

Argentina

IMPORT CHARGES REDUCED ON CERTAIN FISHING VESSELS:

A change in Argentina's import charges on fishing vessels may offer an export opportunity to United States shipbuilders.

To stimulate the renewal of the Argentine fishing fleet, the Argentine Government issued a decree (No. 664/1965) which provides for surcharge exemption on imports of new foreign fishing vessels to be used as models for local vessel construction. The conditions necessary for waiver of the 40-percent import surcharge are: (1) that work on an Argentine "copy" of the imported foreign vessel begin within 180 days of the date the foreign vessel joins the Argentine fishing fleet, and (2) that the Argentine "copy" cost more than the foreign "model." If the copy is less expensive than the model, the 40-percent surcharge must be paid on the difference between the two costs.

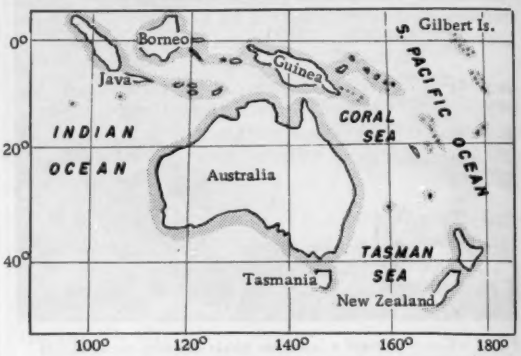
The Argentine fishing industry is interested in rehabilitating and modernizing its fleet. However, financing is a big problem not only for the fishing industry but also for the Argentine shipbuilders. Special credit programs of the official banking system are offering a certain amount of assistance. The surcharge exemption on fishing boats imported for models should help the Argentine industry and also provide an export opportunity for foreign shipyards. (United States Embassy, Buenos Aires, April 12, 1965.)

Australia

TUNA FISHERIES TRENDS, EARLY 1965:

By mid-January, the 1964/65 tuna fishing season off New South Wales on the east coast of Australia was virtually over and the main tuna fleet had sailed for Port Lincoln to prepare for the South Australian tuna season.

Tuna landings in New South Wales to January 20, 1965, were only 2,310 short tons, nearly 700 tons short of the record 1963/64 catch. Bad weather was a factor in the disappointing 1964/65 season.



In February 1965, a Government tuna exploratory project was due to start off Tasmania. Two chartered tuna vessels supported by spotting aircraft were to carry out the experimental fishing tests. (Australian Fisheries Newsletter, February 1965.)

Brazil

GOVERNMENT ASSISTANCE PROGRAMS PLANNED FOR FISHERIES:

Since a change in the administration of SUDENE (Brazil's Federal Government development agency for the Northeast region) in August 1964, that agency has been assigning a higher level of priority to the fishing sector it considers basic to the economic development of that region of Brazil.

A comprehensive research program to supply basic information to the Brazilian fishing industry was presented by the Division of Fishing Resources of SUDENE to the Deliberative Council at its meeting of April 7, 1965. The program includes studies of fishing technology and of the biology of various commercially-important species such as tuna, snapper, flyingfish, mackerel, lobster, shrimp, and mussel ("sururu"--a minature mussel native to the lagoons of Alagoas and basic to the economy of the state), as well as experiments with various methods of preserv-

Brazil (Contd.):

ing fish such as salting and drying. The total cost of the program for the year 1965 is budgeted at Cr$544 million (US$300,000). The program is intended to provide information basic to the implementation of the Program for the Integrated Development of Fishing (Programa do Desenvolvimento Integrado da Pesca), which was to be reviewed by the SUDENE Deliberative Council on May 3, 1965.

Fig. 1 - Fishing vessels at the dock in Santos, Brazil.

In its justification for the program, the Division of Fishing Resources states that "the complete absence of developmental research combined with a fragile and inadequate infrastructure, the lack of knowledge of rational fishing methods, and the traditional utilization of primitive techniques have constituted the major obstacles to the development of fishing in the Northeast. Other obstacles were said to be the physical peculiarities of the Northeastern Continental Shelf, and the biological and ecological habits of its fish population. Those factors was said to have made it difficult to introduce fishing methods commonly used in other areas, such as trawling.

Fig. 2 - Boxes of shrimp on the docks at Santos.

Fig. 3 - In the Entreposto at Santos, fish are iced, landed on trucks, and delivered to Sao Paulo for distribution.

The report outlines the fishing development philosophy of SUDENE as "The urgent necessity of offering to the people of the Northeast a diet which will make up for protein deficiencies at a reasonable cost has led SUDENE, through its Division of Fishing Resources, to draw up a program which, it is hoped, will scientifically demonstrate the rich potential existing in Northeastern waters; determine the dynamics of the fish populations already subject to exploitation; and introduce more efficient methods and techniques to render already operating enterprises more efficient and productive. More efficient conservation and processing methods are also aimed at as well as the processing of byproducts. The program also includes juridical, administrative, and institutional studies which may influence the development of the fishing industry."

The SUDENE research program is broken-down as follows:

1. Studies of Fishing Technology:

   Survey of marine resources of the Northeast.

   Experimentation with fishing methods & techniques.

   Specialized equipment.

2. Studies of Fishing Biology:

   To include fishing of tuna and similar fish, snapper, flyingfish, mackerel,

Brazil (Contd.):

lobster, shrimp, mussels, and specialized equipment.

3. Studies of Fishing Technology:

Experiments in drying & salting of flying fish.

Fishing statistics (flyingfish).

Experiments in pressing of fish.

4. Training and specialization of technical personnel.

SUDENE Activities in Fishing Sector during 1964: A number of studies and projects were conducted by SUDENE during 1964, the most significant of which were:

1. Analysis of sample catches of tuna, albacore, snapper, flyingfish, and mackerel for age and weight, growth and reproduction cycles, dietary habits, etc.

2. Tagging of lobsters for migration studies.

3. Studies of shrimp from 13 different banks for size and weight.

4. Inception of study of the miniature mussel ("sururu") at Lagoa do Mundau, Alagoas.

5. Survey of fisheries lying off the Island of Fernando de Noronha.

6. Experiments on the pressing and salting of flyingfish, needlefish, and swordfish.

7. Survey of the freezing and cold-storage capacity existing in the Northeast region.

8. Preparation of two projects for establishment of fishermen's cooperatives in Rio Grande do Sul.

9. Sale of fishing equipment to fishermen through PENESA (an operational fishing company controlled by SUDENE).

10. Operational fishing by PENESA with two vessels--the Canopus (18-ton capacity) and the Colombo (42-ton capacity).

Source: U. S. Consulate, Recife, April 8, 1965.
Note: See Commercial Fisheries Review, April 1965 p. 61; March 1965 p. 68.

Canada

BRITISH COLUMBIA HERRING LANDINGS AND PRODUCTS, 1964/1965:

Total herring landings in British Columbia during the 1964/65 season were down about 8 percent from the previous season. Compared with the previous season, fish meal production in 1964/65 was down 8 percent, but fish oil production was up 11 percent. (Canadian Department of Fisheries, Vancouver, March 31, 1965.)

Note: See Commercial Fisheries Review, June 1964 p. 37.

British Columbia Herring Landings and Products, 1964/65 Season with Comparisons

Item	Unit	Season Ending: Mar. 27, 1965	March 28, 1964	Mar. 10, 1963	Mar. 10, 1962	Mar. 18, 1961 1/	Mar. 12, 1960 1/
Landings:							
District No. 2:							
Northern	Tons	46,632	35,016	42,792	33,254	47,088	23,239
Central	"	22,107	56,123	62,626	39,032	43,505	10,919
Queen Charlotte Islands	"	46,985	32,582	19,856	16,604	2,896	3,121
District No. 3:							
Lower East Coast	"	37,849	66,216	55,665	51,821	31,309	55,582
Middle East Coast	"	23,845	20,347	24,707	20,561	10,023	20,014
Upper East Coast	"	18,672	15,513	10,697	13,294	2,978	10,005
West Coast	"	44,490	36,248	49,304	49,595	34,142	62,273
Total landings	"	240,580	262,045	265,647	224,161	171,941	185,153
Products Produced:							
Bait	"	893	1,128	886	575	1,619	848
Meal	"	43,062	46,778	48,035	39,535	31,014	34,492
Oil	Imp. Gals.	5,436,358	4,877,688	4,771,087	4,676,991	2,956,948	4,585,307

1/Limited operations.

* * * * *

Canada (Contd.):

FRESH-WATER FISHERIES DEVELOPMENT DISCUSSED BY FEDERAL-PROVINCIAL COMMITTEE:

The Canadian Federal-Provincial Prairie Fisheries Committee met the first week of April 1965. Proposals for loan and marketing assistance for inland fisheries as well as a broad group of other development proposals were reviewed by the Committee, which is made up of Deputy Ministers of Federal and Provincial Departments concerned with inland fisheries.

A regional export sales organization for fresh-water fishery products was one proposal considered at the April meeting. A technical group was asked to study the proposal and report back to the Committee at a meeting to be held in Ottawa on May 7.

The Committee also considered proposals made by subcommittees on suggested designations of grades of fish and standards of quality for the fishery products of the Prairie Provinces, the Northwest Territories, and northwestern Ontario.

A report on the concept of Provincial loan boards and its possible application to the Prairie Provinces was also considered. Federal officials gave the Committee an outline of the Fishing Vessel Assistance Plan and the problems associated with its possible extension to the Prairie Provinces.

Another report heard by the Committee was on the Federal Government's Fisheries Indemnity Plan for vessels and equipment, and it was agreed that the inland Provinces should advise the Federal Government regarding their interest in extension of the plan to their fisheries. It was indicated that the Federal Government would give serious consideration to such an extension.

Other matters considered at the meeting were plans for economic research in the fresh-water fisheries of Canada and development of an improved statistical system for those fisheries. Federal-Provincial programs in Newfoundland were described for the benefit of the Prairie members of the Committee. Biological and technological research programs in fresh-water fisheries were discussed by the Chairman of the Fisheries Research Board of Canada. (Canadian Department of Fisheries, Ottawa, April 9, 1965.)

Ceylon

FISHING INDUSTRY AIMS AT FIVEFOLD INCREASE IN CATCH:

Ceylon, an island country of 12 million people, is aiming at a fivefold increase in its annual fish catch within the next 10 years.

A marine engineer with the Food and Agriculture Organization (FAO) who recently returned from a 12-year assignment in Ceylon said: "Ceylon has already come a long way in fishing. In 1948, the year she gained her independence, the national catch was 24,000 metric tons. Last year's catch, despite a devastating cyclone in December, was above 100,000 tons." Even so, 2 of every 3 pounds of fish sold in the country were imported and paying for the imported fish was a strain on the nation's exchange earnings, he said. "The Ceylonese need about 300,000 tons a year to reach self-sufficiency. And, of course, they would like to develop an export trade in fish and fish products. That's why they have set a yearly catch of 500,000 tons as their long-range goal."

Fig. 1 - An FAO technologist helps Ceylonese fishermen fit an outboard motor to a log raft known as a "teppam."

Heading the drive for more fish is the Government-managed Ceylon Fisheries Development Corporation, which was organized in late 1964. The first job facing the new corporation is rebuilding that part of the Ceylonese fishing fleet that was destroyed or damaged by last year's cyclone. To help rebuild its fleet, the Ceylonese Government has received a contribution of US$16,800 from the National Freedom from Hunger Campaign Committee of the United Kingdom, a gift of modern fishing equipment worth $4,500 from Denmark, and a pledge of $56,000 from the World Council of Churches.

Ceylon (Contd.):

On the long-range front the Ceylonese are also looking for outside help. The FAO marine engineer who has just returned from Ceylon said, "The Ceylonese know they can't do the whole job by themselves. They are trying very hard to make prospects attractive to private interests. They need foreign capital in almost every sector of the fishing industry; to pay for more boats and fishing equipment, for harbor development, communications, marketing facilities, and for construction of new storage and preservation plants."

Fig. 2 - Ceylonese fishermen land a swordfish taken by long-line fishing.

The Ceylonese like fish as much as the Japanese. The average Ceylonese eats about 45 pounds of fish a year. The principal fish taken in the national catch are various forms of sardines, skipjack, frigate mackerel, snapper, and bottomfish. Most of Ceylon's fishery imports, largely dried and salted fish, come from neighboring India and Pakistan and the Maldive Islands.

By increasing her own fisheries catch, Ceylon has managed to reduce the per capita cost of imports by better than half in the last 10 years, according to the FAO marine engineer. "When I got to the country, the Ceylonese, with a smaller population, were paying out about $20 million a year for fish imports. Last year, with more people, this was down to $12 million," he said.

Fifteen years ago not one of Ceylon's approximately 20,000 fishing craft had a motor. Since then, a mechanization program started with FAO assistance has equipped some 1,500 native Ceylonese craft with outboard motors. About 800 inboard-powered boats of 25 feet or more have also been built under the mechanization program. Fishing fleet improvement, along with the introduction of modern gear and the training of local fishermen, has accounted for Ceylon's increased catch.

Note: See Commercial Fisheries Review, Nov. 1964 p. 80; Oct. 1962 p. 48; Dec. 1962 p. 65.

Chile

FISH MEAL INDUSTRY CONTINUES TO SUFFER FROM ANCHOVETA SHORTAGE IN EARLY 1965:

Preliminary data for 1965 show the Chilean anchoveta catch as only 84,000 metric tons in January and 67,000 tons in February. Those landings are much less than the corresponding monthly catches in 1964 of 160,000 tons and 148,000 tons, respectively.

Late in February 1965, a spotter plane provided by the Fisheries Development Institute of Chile located schools of anchoveta in waters near Mejillones, and some 30,000 tons of anchoveta were taken between February 24 and March 2, largely by vessels based at the port of Iquique. However, the catch dropped off again in early March 1965.

The Fisheries Development Institute is requesting funds from the Production Development Corporation of Chile (CORFO) to permit it to continue fish spotting for the industry as a whole. The Institute plans to equip the spotter plane with an infrared thermometer capable of measuring water temperatures within half a degree centigrade. According to current theory, anchoveta are only found where water temperature is between 14° and 18° C. (57.2°-64.4° F.). Use of the thermometer should thus permit the plane to find those areas in which fishing conditions are most favorable. Commercial spotter planes have been used by individual companies, but reportedly without great success, since other vessels were quick to pick up radio signals and take advantage of the service without paying for it.

Iquique, the center of the Chilean fish meal industry, has been hit hardest by the anchoveta shortage. Anchoveta landings at Iquique have been far below the 25,000 tons per week needed for financially successful operations. It is estimated that 100 vessels (12-13 men per vessel) have been staying in port during

Chile (Contd.):

the past several months due to the absence of anchoveta.

While the Iquique industry was thus depressed, anchoveta catches were somewhat more abundant in January off Arica, just south of the Peruvian border. In January 1965 Arica plants produced some 5,200 tons of meal valued at about $450,000, augmented by 73,000 kilos (160,936 pounds) of fish oil worth $14,000. That was close to Arica's production in the same month of 1964. During February 1965, however, landings in Arica fell to 9,200 tons (1,380 tons of meal), the lowest level for that month in the last 3 years.

The Iquique shipyard operated by a United States-Chilean firm announced in mid-February 1965 that 50 workers were to be laid off. It was explained that due to the long absence of anchoveta new vessel orders had not been received and some orders had even been cancelled. Despite the cutback, the shipyard will remain in Iquique for the time being and maintain a repair shop. Later in the year the company plans to begin construction of 82-foot refrigerated tuna vessels. (United States Embassy, Santiago, April 10, 1965.)

Costa Rica

IMPORTS OF CANNED SARDINES RESTRICTED BY HEALTH AUTHORITY:

Importers of canned sardines in Costa Rica were sent a letter dated February 12, 1965, from the chief of Costa Rica's Food Control Office, Ministry of Public Health, setting forth the reasons for rejecting numerous shipments of canned sardines which had been shipped to that country from the United States, South Africa Republic, and other countries.

The letter referred to "pitting" of the tin due to weak coatings of lacquer and mottling of the lacquer in the tins. The chief of the Food Control Office admitted that while the product itself was found to be in good condition, the defect in the lacquer coating would reduce substantially the shelf life of the product in that tropical country.

Because of the approaching Holy Week in the Lenten Season, a period when consumption of canned sardines is heaviest in that country, the clearance of shipments then in Costa Rican customhouses was authorized for that one time, but with the warning that two months after the date of the February 12 letter, clearance no longer would be authorized if shipments continued to reveal the same defects in mottling and flaking; and also if the food product was not duly registered in the country in accordance with Article 252 of the Sanitary Code of Costa Rica. Otherwise, shipments will be reexported, or confiscated and destroyed, the chief of the Food Control Office said.

Costa Rican Imports of Canned Sardines by Country of Origin, 1960-1964

Country of Origin	1964	1963	1962	1961	1960	Average 1960-64
	(US$1,000)					
United States	105	183	163	234	235	184
S. Africa Rep.	215	126	69	22	14	89
Spain	38	37	27	32	34	34
Morocco	51	44	25	17	22	32
Canada	13	14	1/	10	17	11
Netherlands	14	10	6	2	2	7
Other	17	49	22	16	21	24
Total	453	463	312	333	345	381

1/Less than $500.
Source: Direccion General de Estadisticas y Censos, Costa Rica.

The Costa Rican authorities' refusal to permit the entry of sardines in cans which show discoloration of the lacquer is expected to adversely affect exports of sardines to that country from the United States which heretofore has been the principal supplier. Costa Rica's total imports of canned sardines during the past five years have averaged US$381,000 per year in value. Of that total, the United States accounted for 48.3 percent, and South Africa Republic (a country from which some U. S. packers export their product) 23.4 percent.

A Food Consultant on contract with the U. S. Agency for International Development (USAID/Costa Rica), who is considered well qualified to comment on the matter, suggests that the trouble actually is a harmless black spot inside the can as a result of a chemical reaction between the sulphides of the fish with a chemical in the lacquer. If there were also some peeling he feels that the can would not deteriorate to the extent that it would be dangerous to the consumer.

Earlier, Costa Rica's chief of the Food Control Office ordered the return of a shipment of sardines to the Netherlands because of discoloration in the lacquer. In order to

Costa Rica (Contd.):

avoid the future return of any of its shipments, the Dutch company changed to another type of lacquer (gray in color) which does not show discoloration. The fact that the change was made by the Dutch company has led Costa Rican authorities to believe that the earlier decisions to reject shipments which showed discoloration were justified. Indications are that only the product of that Dutch company will be permitted entry into Costa Rica after April 12, 1965, or until such time as other brands change their lacquer to one which shows no discoloration or peeling. (United States Embassy, San Jose, March 16, 1965.)

Denmark

EXPORTS OF INDUSTRIAL PRODUCTS, 1963-1964:

Danish exports of fish oil (largely herring) totaled 30,357 metric tons in 1964, compared with 20,754 tons in 1963.

Exports of herring meal, however, declined to 56,340 tons in 1964 from 60,389 tons in 1963. Shipments of other fish meal in 1964 increased to 4,948 tons from 1,846 tons in 1963, and those of fish solubles to 17,298 tons from 10,000 tons. (Foreign Agriculture, U.S. Department of Agriculture, April 12, 1965.)

* * * * *

SEAL SKINS FROM ALASKA AND CANADA INCLUDED IN FEBRUARY 1965 AUCTION OF GREENLAND SEAL SKINS:

The Royal Greenland Trade Department held another of its regular auctions for Greenland seal skins of February 25, 1965, in Copenhagen, Denmark. Included were 680 Alaska hair seal skins designated as Alaska rangers (from younger and smaller seals) which sold at prices ranging from US$30.40 to $32.60 a skin. (That was the second appearance of Alaska skins at a Danish auction, the first lot of Alaska skins having been sold at the Danish auction of September 9, 1964, for $31.10-38.40 for prime young washed rangers and $22.45-39.80 for prime old washed rangers.)

Also included in the Danish auction in February were 1,275 Canadian seal skins. The price ranges for the main lots of the Canadian skins were $37.60-48.60 a skin for 695 washed rangers and $14.50-32.60 for 261 washed saddlers (skins from older and larger seals).

Greenland skins sold at the auction included 32,872 ringed (netsider) skins which were sold at prices ranging up to $40.30, but averaging somewhat less than in the previous auction when 21,316 ringed seal skins brought an average price of $20.40 a skin. Prices at the two auctions are not entirely comparable since the February auction included a larger proportion of small and slightly damaged skins. Also sold at the February auction were 1,743 other Greenland skins (from harp, bladdernosed, and saddle seals) at prices ranging from $3.80 to $55.00.

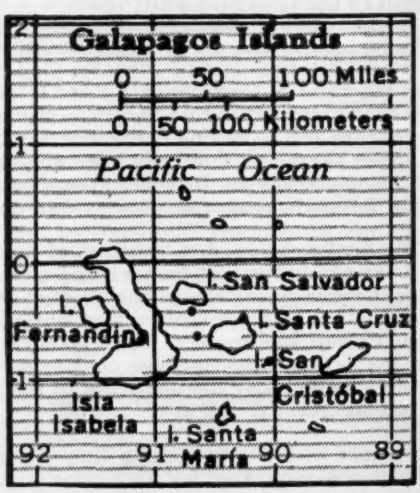
The next sale of Greenland seal skins by the Royal Greenland Trade Department is scheduled for September 17, 1965. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, March 24, 1965.)

Note: See Commercial Fisheries Review, March 1965 p. 73.

Ecuador

FISHERY TRENDS IN GALAPAGOS ISLANDS, 1963:

The 1963 fishery catch of Ecuador's Galapagos Islands was estimated to be 550 metric tons. Spiny lobster, sea bass, and mullet



Ecuador (Contd.):

were the most important species, although small quantities of shark and tuna were also landed. Virtually all of the catch is processed, with frozen lobster tails, salted and dried sea bass, and mullet the principal processed products.

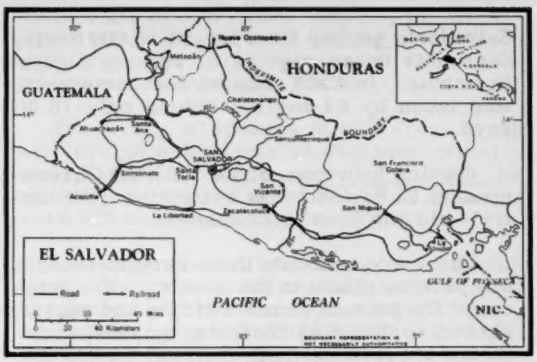
The Galapagos Islands' fishing fleet consists of 64 vessels, all but 6 of which are motorized. Included in the total are 3 vessels serving as a base of operations for lobster fishing, and 1 refrigerated transport vessel of 268 gross tons, which carries fish between the Galapagos and Guayaquil.

El Salvador

SHRIMP INDUSTRY TRENDS, 1964:

Summary: During 1964, El Salvador's shrimp fleet landed a total of 7.6 million pounds of shrimp--down only slightly from the previous year, but about 10 percent below 1961's record high. The 1964 shrimp exports of 7.2 million pounds were exceeded only in the record year of 1961. Due to lower prices, however, the total value of shrimp exports in 1964 declined to US$4.2 million, a drop of about 9 percent from 1963. Almost all of El Salvador's shrimp exports went to the United States. It is estimated that 339,000 pounds of shrimp were consumed domestically in El Salvador in 1964.

Landings: White shrimp of large size (20 shrimp and less per pound) made up about



half of the 1964 shrimp landings. The quantity of white shrimp landed in El Salvador during the last 4 years has been fairly constant.

The other major item in the catch was sea bob.

The catch of pink and brown shrimp has been declining steadily. The brown shrimp catch in 1964 was only one-fourth that of 1961; pink shrimp landings in 1964 were down about 50 percent from 1961.

The total catch of other shellfish (mainly spiny lobster) and miscellaneous fish landed by the shrimp fleet has been growing about 10 percent annually, and reached 3.1 million pounds in 1964. The shrimp vessels probably still discard part of their fish catch at sea for lack of a ready market.

An increasing fishing effort is being required per unit of catch. During 1964, El

El Salvador Shrimp Industry: Landings, Exports, and Fishing Effort, 1958-1964

Item	Unit	1964	1963	1962	1961	1960	1959	1958
Shrimp Landings:1/								
White	1,000 lbs.	3,851	3,632	3,485	3,856	4,458	1,846	1,179
Pink	" "	831	1,054	1,212	1,652	2,243	11	0
Brown	" "	228	205	254	960	433	1	0
Total shrimp, other than sea bob	" "	4,910	4,891	4,951	6,468	7,134	1,858	1,179
Sea bob	" "	2,715	2,820	3,310	2,037	663	64	116
Total shrimp landings	" "	7,625	7,711	8,261	8,505	7,797	1,922	1,295
Other Fisheries Landings	" "	3,090	2,594	2,013	1,729	1,351	854	1,132
Shrimp Exports:1/								
Quantity2/	" "	7,247	6,842	7,156	8,113	6,700	1,838	1,131
Value2/	US$1,000	4,227	4,668	5,150	5,505	4,216	1,298	660
Shrimp Fishing Effort:								
Average number of vessels equipped for fishing	Number	67	64	65	63	53	16	14
Total vessel fishing days of fleet	Days	19,000	18,000	16,000	15,000	12,000	3,000	2,000

1/Headless shrimp.
2/Preliminary.
Source: Fisheries Section, El Salvador, Ministry of Economy.

San Salvador (Contd.):

Salvador's shrimp fleet logged 19,000 fishing days with an average of 67 vessels engaged in fishing. In 1963, almost the same catch was taken by 64 vessels fishing only 18,000 days.

Fishing Industry: Since 1962, the Government of El Salvador has restricted the country's shrimp fleet to 73 vessels.

There are now only three shrimp-freezing and packing plants in the country. The largest of the present firms freezing and packing shrimp operated 58 boats during 1964, and landed about 80 percent of El Salvador's total shrimp catch. That firm's freezing and packing facilities are located at Puerto El Triunfo. The firm is adding new machinery and expects to begin producing the higher-priced peeled and deveined shrimp for export in 1965. Another shrimp company located at Puerto El Triunfo operated 16 vessels in 1964. The third company operated only four vessels in 1964. Its plant is located at La Union on the Gulf of Fonseca.

Exports, Consumption and Stocks: A total of 7,247,000 lbs. of shrimp valued at $4,227,000 was exported in 1964. Those exports yielded the Government of El Salvador 1,085,000 colones ($434,000) from the export tax of 6 U. S. cents a pound. Domestic shrimp sales (mainly sea bob) totaled about 339,000 pounds. The difference of 39,000 pounds between production and the total of exports and domestic consumption presumably remained as year-end stocks. The greater portion of El Salvador's shrimp exports go to the United States, by trailer truck to the Caribbean coast of Guatemala, then by freighter to Miami, Fla.

Outlook: The present white shrimp fishery in Salvadoran water seems capable of supporting a catch of around 4 million pounds annually on a sustained yield basis. In view of the foreign exchange to be earned from shrimp exports, it would appear desirable to increase the catch of brown and pink shrimp. "Royal-red" shrimp are also probably available in Salvadoran waters, but they are not now harvested in any appreciable quantity. It is hoped that the United Nation's Special Fund $1.5 million 6-year technical assistance program to the Central American fishing industry will provide additional information on brown, pink, and royal-red shrimp stocks in Salvadoran waters. (United States Embassy, San Salvador, April 22, 1965.)

Note: See Commercial Fisheries Review, Dec. 1964 p. 91 and Feb. 1962 p. 64.

German Federal Republic

FISH MEAL AND OIL INDUSTRY TRENDS FOR 1964 AND OUTLOOK FOR 1965:

Fish Meal: West German imports and consumption of fish meal reached new highs in 1964. (Editor's Note: West German fish meal imports in 1964 totaled 391,900 metric tons as compared with only 295,300 tons in 1963, according to Oil World Weekly. The International Association of Fish Meal Manufacturers has reported West German domestic production of fish meal in 1964 as 73,900 tons, or only 16 percent of the total supply.)

The increase in West German fish meal imports was due mainly to larger shipments from Peru (the leading supplier), Chile, Angola, and South Africa Republic.

The increase in West German consumption of fish meal was due mainly to increased pork and egg production and improved feeding practices. Those factors will also be effective during 1965, but the increases will probably be smaller than last year.

Fish meal price increases in the first part of 1965 are due partly to Soviet purchases on the world market, according to trade sources in the West German industry. They believe Soviet purchases will continue, but West German fish meal consumption will probably hold fairly steady even if prices increase somewhat over current levels.

Fish Oil: West German fish oil imports totaled 65,743 tons in 1964 and 65,105 tons in 1963. The leading suppliers were Peru (with 32,349 tons in 1964 and 31,627 tons in 1963) and and the United States (with 17,263 tons in 1964 and 11,371 tons in 1963). West German exports of fish oil in 1964 totaled 12,681 tons, down 30 percent from the 17,992 tons shipped in 1963.

Whale Oil: West German imports of whale oil totaled 51,233 metric tons in 1964 compared with 66,188 tons in 1963. Japan was the leading supplier with 34,029 tons in 1964

German Federal Republic (Contd.):

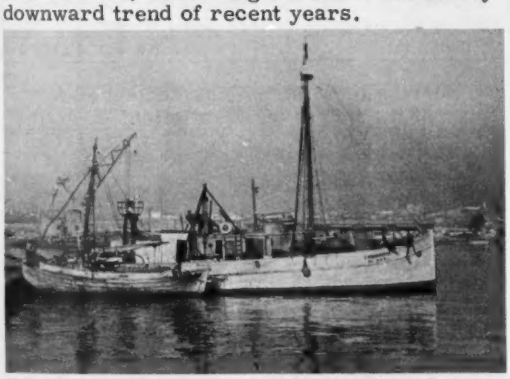
and 42,249 tons in 1963, followed by Norway with 5,133 tons in 1964 and 11,515 tons in 1963. West German exports of whale oil totaled only 168 tons in 1964 and 441 tons in 1963. (United States Embassy, Bonn, April 1, 1965.)

Greece

FISHERIES TRENDS, 1964:

Greece's total catch of fish in 1964 was estimated at 105,000 metric tons (up 2 percent from 1964) valued at US$34.7 million (up 5 percent). Greek coastal waters yielded about 67,000 tons in 1964 (down 3 percent); the Mediterranean yielded 7,500 tons (down 18 percent) and Greek lakes and breeding stations yielded 9,500 tons (up 58 percent).

The 1964 Greek catch in the Atlantic increased by 13 percent over 1963, reaching a total of 21,039 tons valued at about $7 million. The number of Greek freezer trawlers in the Atlantic fleet increased to 29 vessels in 1964 with a combined tonnage of 17,990 tons. The average yield per freezer trawler was 935 tons in 1964, continuing the small but steady downward trend of recent years.



Fishing vessels at Pireaus, Greece, fishing port for the City of Athens.

Recent legislation by the Greek Parliament classifies high-seas fishing catches as "industrial products" and so authorizes the imposition of an antidumping tariff against imports from other countries when dumping is proven.

To reopen important African fishing and sponge grounds to Greek vessels, the Greek Government has signed a fishing agreement with Libya and Mauritania, and Greek negotiations are planned with Tunisia.

Production of sponges in 1964 from Greek and foreign waters totaled 80.9 tons valued at $1,154,000, about the same as in 1963. In addition, 8.9 tons of coral valued at about $148,000 were harvested in 1964.

The experimental breeding of trout at the Government's hatchery on the Louros river has proven highly successful. Some 25 percent of the fry laid in March 1963 grew into marketable fish in only 8 months. About 5 tons of hatchery trout were sold in 1964. The average yield per square meter of basin has been 10 kilograms (22 pounds) of trout annually. One small Greek private firm is now engaged in trout breeding, and Government officials believe that more firms could profitably enter this field. (United States Embassy, Athens, February 5, 1965.)

Note: See Commercial Fisheries Review, Jan. 1965 p. 80; June 1964 p. 40; May 1964 p. 51.

Iceland

HERRING EX-VESSEL PRICES SET FOR MARCH 1-JUNE 15, 1965:

Minimum ex-vessel prices for south and west coast herring during March 1-June 15, 1965, were set by the Icelandic Fishing Industries Price Committee as follows:

Herring for freezing, salting and filleting--Kr. 1.56 a kilo (1.64 U. S. cents a pound).

Herring for reduction, unsorted--Kr. 1.40 a kilo (1.47 U. S. cents a pound).

Herring for animal feed--Kr. 1.00 a kilo (1.05 U. S. cents a pound).

The price of reduction herring is more than double the reduction price of Kr. 0.67 a kilo (0.71 U. S. cents a pound) in effect March 1-June 15, 1964. (United States Embassy, Reykjavik, March 30, 1965.)

Note: Icelandic Kr. 43.06 equal US$1.00.

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Iceland (Contd.):

EXPORTS OF FISHERY PRODUCTS, 1963-64:

During 1964, there was a considerable increase in exports of frozen fish fillets, cod-liver oil, fish meal, and herring meal as compared with 1963, according to the Statistical Bureau of Iceland's Statistical Bulletin, Feb-

Icelandic Fishery Exports, 1963-64

Product	1964			1963		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Salted fish, dried	1,138	28,154	653	2,420	53,958	1,252
Salted fish, uncured	23,955	371,321	8,615	18,990	239,321	5,552
Salted fish fillets	1,428	21,839	507	1,114	14,346	333
Wings, salted	1,173	14,765	343	1,539	18,793	436
Stockfish	11,580	337,403	7,828	9,616	278,636	6,465
Herring on ice	392	1,104	26	7,311	23,610	548
Other fish on ice	34,512	215,039	4,989	36,161	202,066	4,688
Herring frozen	21,991	129,918	3,014	37,384	208,497	4,837
Other frozen fish, whole	4,814	53,050	1,231	3,952	41,102	954
Frozen fish fillets	54,095	1,096,264	25,433	47,903	895,954	20,786
Shrimp and lobster, frozen	1,171	109,926	2,550	1,138	96,823	2,246
Roes, frozen	1,703	27,900	647	860	14,869	345
Canned fish	381	20,067	466	340	16,310	378
Cod-liver oil	9,815	91,717	2,123	8,650	66,094	1,533
Lumpfish roes, salted	419	10,609	246	324	5,322	123
Other roes for food, salted	3,971	43,939	1,019	3,180	44,981	1,044
Roes for bait, salted	3,049	25,280	586	1,745	12,571	292
Herring, salted	46,223	517,085	11,996	57,282	552,053	12,808
Herring oil	52,403	417,618	9,689	55,148	301,357	6,991
Ocean perch oil	28	188	4	754	5,130	119
Whale oil	4,499	37,582	872	3,444	24,482	568
Fish meal	26,738	166,368	3,860	22,809	119,689	2,777
Herring meal	96,379	594,803	13,799	76,583	439,661	10,200
Ocean perch meal	2,265	13,239	307	4,028	18,667	433
Wastes of fish, frozen	7,166	22,867	533	4,779	13,181	306
Liver meal	575	3,827	89	442	3,036	70
Lobster and shrimp meal	156	686	16	267	693	16
Whale meal	1,387	7,698	179	100	556	13
Whale meat, frozen	2,277	18,167	421	2,447	17,138	398

Note: Values converted at rate of 1 krona equals 2.32 U. S. cents.

ruary 1965. Exports of herring on ice, frozen herring, salted herring, and herring oil showed a decrease in 1964.

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EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, FEBRUARY 28, 1965:

Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled

Icelandic Export Stocks1/ of Principal Fishery Products, February 28, 1965

Item	Quantity	Value	
	Metric Tons	Million Kr.	US$ 1,000
Groundfish, frozen:			
For export to:			
U. S.	2,157	47.5	1,103.1
Other countries	1,386	24.0	557.4
Stockfish	4,030	112.8	2,619.6
Herring:			
Salted	2/	16.3	378.5
Frozen	3/5,572	33.0	766.4
Industrial products:			
Fish meal:			
Herring	5,381	35.5	824.4
Other fish	4,526	18.7	434.2
Herring oil	26,347	218.7	5,079.0

1/Includes only stocks intended for export.
2/Not available.
3/Includes 313 tons of frozen herring fillets valued at Kr. 3.0 million (US$69,670).
Note: Icelandic kronur 43.06 equals US$1.00

2,157 metric tons as of February 28, 1965 (see table). (United States Embassy, Reykjavik, March 26, 1965.)

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and slabs, 4,669 metric tons of cod fillets, 2,791 metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.

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EXPORTS OF FISH OIL AND MEAL, 1962-1964:

Iceland's exports of fish and fish-liver oils in 1964 totaled 62,246 metric tons, 4 percent below the previous year's tonnage. Exports of fish meal increased 21 percent to 125,957 tons in 1964, the largest volume on record.

Iceland's Exports of Fish Oil and Meal, 1962-1964

Item	1964	1963	1962
	(Metric Tons)		
Oil:			
Herring	52,403	55,184	60,478
Ocean perch	28	754	15
Cod-liver	9,815	8,650	5,312
Total fish and fish-liver oil	62,246	64,588	65,805
Meal:			
Herring	96,379	76,583	48,489
Ocean perch	2,265	4,028	437
Other fish	26,738	22,809	20,230
Fish-liver	575	442	320
Total meal	125,957	103,862	69,476

Herring meal shipments accounted for most of the increase. (Statistical Bulletin of Iceland, Vol. 34, No. 1, February 1965.)

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FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-OCTOBER 1964:

Species	Jan.-Oct.		Jan.-Sept.	
	1964	1963	1964	1963
	(Metric Tons)			
Cod	270,469	218,655	265,638	214,701
Haddock	48,992	42,470	42,703	38,738
Saithe	20,216	13,117	18,894	11,946
Ling	4,302	5,035	3,879	4,804
Wolffish (catfish)	8,159	16,952	8,110	12,839
Cusk	2,962	5,179	2,846	5,013
Ocean perch	25,174	29,911	23,063	28,059
Halibut	1,019	1,025	926	914
Herring	501,350	370,832	441,488	362,597
Shrimp	348	512	202	349
Capelin	8,640	1,077	8,640	1,077
Lobster	2,626	4,874	2,612	4,806
Other	9,827	6,909	8,497	6,360
Total	904,084	716,548	827,498	692,203

Note: Except for herring which are landed round, all fish are drawn weight.

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Iceland (Contd.):

UTILIZATION OF FISHERY LANDINGS, JANUARY-OCTOBER 1964:

How Utilized	Jan.-Oct.		Jan.-Sept.	
	1964	1963	1964	1963
	(Metric Tons)			
Herring[1] for:				
Canning	218	296	93	296
Oil and meal	427,497	267,338	376,811	264,388
Freezing	20,437	26,342	14,604	22,285
Salting	53,198	71,240	49,980	70,012
Fresh on ice	-	5,617	-	5,617
Groundfish[2] for:				
Fresh on ice	31,671	29,663	27,514	24,796
Freezing and fillets	173,935	155,955	165,728	147,604
Salting	87,768	69,662	85,727	69,109
Stockfish (dried unsalted)	82,067	68,530	81,435	67,685
Canning	24	35	24	35
Oil and meal	3,455	3,186	3,094	2,977
Capelin for:				
Freezing	133	188	133	188
Oil and meal	8,507	889	8,507	889
Shrimp for:				
Freezing	190	399	166	267
Canning	159	113	36	82
Lobster for:				
Fresh on ice	-	2	-	2
Freezing	2,626	4,872	2,612	4,804
Home consumption	12,199	12,221	11,034	11,167
Total production	904,084	716,548	827,498	692,203

1/Whole fish.
2/Drawn fish.

India

JOINT FISHING VENTURES AND SHRIMP TRADE WITH JAPAN PROPOSED:

Indian trade representatives on April 10, 1965, were reported to have approached the Japanese Overseas Fishery Cooperative Association (a Government-sponsored organization) with offers to establish various types of joint fishing ventures in India with major Japanese fishing firms. The proposals were taken for study by the Association. One large Japanese fishing company has been operating a joint trawl fishery with Indian interests for over 10 years.

The Indian representatives are also said to be seeking to export to Japan shrimp which reportedly are being taken in increasing quantity off Cochin. (Shin Suisan Shimbun Sokuho, April 13, 1965.)

Japan

PROGRESS ON NEGOTIATIONS ON CANNED TUNA IN BRINE EXPORTS TO U. S.:

Japanese canned tuna in brine exports to the United States have been suspended since December 1964 as a result of the failure of the Japanese tuna packers and exporters to conclude an "Exporters Agreement." However, developments in late March indicated that the dispute might be settled shortly.

On March 15, 1965, the Exporters Association submitted to the Ministry of International Trade and Industry (MITI) an agreement calling for a 20-percent adjustment quota (for packers' use). This agreement differed with the memorandum exchanged between the packers and exporters which called for a 30-percent adjustment quota, and the packers were quick to point this out. The problem was later resolved by the Exporters Association's submission to MITI of a memorandum stating that the packers would have sole allocation rights over the 30-percent adjustment quota, thereby removing the packers' objection to the new agreement.

On March 29, MITI promulgated the ministerial trade control ordinance applicable to all Japanese canned tuna in brine exports from April 1, and on March 30 announced the "Standard for Approval of Canned Tuna Exports to the United States" by which the Government will approve a total of 2.3 million cases of canned tuna in brine for export during the period April 1-November 30, 1965. However, as of the end of March, a slight uncertainty continued to persist among some packers inasmuch as MITI and the Ministry of Agriculture and Forestry, the two government agencies concerned with canned tuna exports, had not exchanged any note concerning the method of determining the allocation of the adjustment quota.

Reportedly, the prolonged suspension of canned tuna exports to the United States has reduced Japanese canned tuna in brine holdings in the United States to an extremely low level. According to a report filed by the Japan Export Trade Promotion Organization representative stationed in New York in March, holdings in the United States of Japanese 7-ounce whitemeat solid pack had hit bottom and the supply of 4-pound lightmeat solid pack had been completely exhausted. (Suisancho Nippo, April 1; Suisan Tsushin, March 31; Suisan Keizai Shimbun April 1; Nihon Suisan Shimbun, March 29, 1965.)

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Japan (Contd.):

ALBACORE TUNA FISHING CONDITIONS OFF JAPAN AND FROZEN TUNA EXPORT PRICE TRENDS:

Albacore tuna fishing off the Japanese islands commenced two weeks later than usual this year due to cold water conditions. But fishing picked up considerably in early April. A total of 160 metric tons were landed at Yaizu on April 6, 1965. About 50 pole-and-line vessels were fishing albacore. Japanese tuna packers were offering 120-135 yen per kilogram (US$302-340 a short ton) for the pole-caught fish.

A Japanese tuna long-liner.

In mid-April, frozen tuna from Japan proper for export to the United States was quoted (price a short ton, c. & f.): round albacore--around $365; yellowfin (gilled and gutted) $355-360.

A Japanese trading firm contracted for the delivery of 800 short tons of Indian Ocean albacore for export to the United States at c.i.f. $365 a short ton. (Suisan Keizai Shimbun, April 10; Suisancho Nippo, April 9, 1965, and other sources.)

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ATLANTIC TUNA FISHERY AND PRICE TRENDS, MARCH 1965:

A total of around 150 Japanese tuna vessels was reported operating in the Atlantic Ocean in late March 1965. Of that number, about 120 were concentrated in the yellowfin and big-eyed tuna fishing grounds north of the Equator nearby the Cape Verde Islands and about 30 fishing for albacore tuna south of the Equator. However, albacore catches were reported falling off.

Exports of frozen dressed yellowfin to Italy as of late March were US$420-425 a metric ton, c.i.f., down $15 per ton from early March prices. The market was turning soft due to high canned tuna inventories being carried by Italian packers. Frozen dressed big-eyed shipments in Italy were US$280 a metric ton, c.i.f.

Japanese exporters, in late March, were shipping most of their albacore to Spain following issuance of an export permit of 3,000 metric tons to that country. Initially, albacore shipped to Spain brought US$400 a metric ton, c.i.f., but later declined to $380 a ton. However, those prices were $15-25 a ton higher than the prices for albacore shipped to the United States. Reportedly, Japanese-caught Atlantic albacore for export to the United States were offered at $275 a short ton, f.o.b. West African port, but U. S. packers were showing little buying interest at that price. (Suisan Tsushin, April 2 & 3, 1965, and other sources.)

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LARGER VESSELS TO OPERATE FROM OVERSEAS TUNA BASES:

Under a new regulation by the Japanese Fisheries Agency, effective April 1, 1965, the size limit on tuna fishing vessels operating out of South Pacific tuna bases was raised from 180 gross tons to 240 gross tons, or the same as the tonnage limit for catcher vessels engaged in the tuna mothership operations. At the same time, the Agency simplified administrative procedures for vessels wishing to fish out of established overseas bases and for vessels seeking to unload catches at overseas bases under certain conditions. (Suisan Tsushin, March 27, 1965.)

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TUNA PURSE-SEINE FLEET OFF WEST AFRICA REPORTS POOR FISHING:

A Japanese fishing company's 2-boat tuna purse-seine fleet (led by the 1,600-ton refrigerated mothership Chichibu Maru No. 2), which has been operating off West Africa since early November 1964, reports poor fishing. As of early April, the fleet caught less than 1,000 metric tons of tuna, predominantly skipjack and scarcely any yellowfin. The skipjack were smaller than those found off the coast of Japan, averaging under two kilograms (4.4 pounds) per fish.

During the early stages of the West African operation, the skipjack were observed to be escaping the net by diving under it. This

Japan (Contd.):

was corrected by modifying the net, making it sink faster, and by speeding up the pursing operation. However, the skipjack schools recently encountered by the fleet are reported to be skittish, making it difficult to completely surround them before they escape. As many as 7 or 8 schools are sighted per day, but the schools are reported to be small when compared to those found off the Japanese coast. (Shin Suisan Shimbun Sokuho, April 6, 1965.)

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TUNA LONG-LINE FISHERY MANAGEMENT:

The Japanese Fisheries Agency has released a report, "Research and Analysis of Distant-Water Tuna Long-Line Fishery Management," prepared by Assistant Professor Akira Nakai of the Kochi Junior College. The report, which is based on a study of the tuna long-line vessel operators in Muroto City, Kochi Prefecture, points out the need to reappraise Japan-based independent tuna fishing operations. It ascribes the deteriorating economic position of the tuna fishery to the following factors: (1) reduced net income resulting from high operating costs; (2) depreciation of new vessels; (3) declining value of production of old, inefficient vessels; (4) rising rates of interest on loans extended to owners of large vessels and bad debts resulting from advance payment of wages to crew members by small vessel owners; and (5) excessive capital investments with borrowed money, resulting in overburdening the one-family one-vessel type of fishery operators. (Suisan Keizai Shimbun, April 9, 1965.)

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TUNA EXPORTERS UNHAPPY OVER YUGOSLAVIAN GRADING SYSTEM:

The grading system (based on yield) adopted by Yugoslavia since January 1965 for imported frozen tuna has resulted in claims being pressed against the Japanese trading firms handling exports to that country. The firms are not happy over this development and the Japan Frozen Foods Exporters Association is looking into the problem. Some exporters have suggested that tuna exports to Yugoslavia should be temporarily ended for a month or two if Yugoslavia does not abolish the grading system. (Suisancho Nippo, April 7, 1965.)

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GOVERNMENT CONSIDERING FORMING SPECIAL TUNA STUDY GROUP:

The Japanese Fisheries Agency is considering establishing a special study group composed of industry and government officials to study the problems confronting the Japanese tuna fishery. Formation of the study group had been requested by the National Federation of Tuna Fishermen's Cooperative Associations, which has for some months been studying ways and means of overcoming the depressed conditions facing tuna vessel operators. (Suisan Keizai Shimbun, April 10, 1965.)

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MODERN TUNA PURSE SEINER BEING CONSTRUCTED:

A modern 212-ton Japanese purse seiner, Taikei Maru (equipped with two power blocks), was constructed in a shipyard in northern Japan. It is reported that the purse seiner is the first Japanese fishing vessel to be equipped with two power blocks and is, in addition, equipped with a brine-freezing system and the latest communication equipment, including facsimile and ultrahigh-frequency radio. The vessel was scheduled for completion in early May 1965.

The first Japanese purse seiner to employ a power block for net hauling was the Kenyo Maru (240 gross tons) in the summer of 1962. Reportedly, the adoption of the hydraulic power block reduced manpower requirements on that vessel from 30 to 17. (Shin Suisan Shimbun Sokuho, April 7, 1965.)

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NORTH PACIFIC SALMON CATCH QUOTA ALLOCATION FOR 1965:

On April 8, the Japanese Fisheries Agency announced salmon catch quota allocations for the 1965 Western Pacific season as follows (with 1964 comparisons):

	1965	1964
	. . . (Metric Tons) . . .	
Area A (north of 45° N. latitude):		
Mothership-type fishery	45,478	44,665
Land-based gill-net fishery . .	10,522	10,335
Subtotal	56,000	55,000
Area B (south of 45° N. latitude):		
Land-based gill-net fishery . .	35,300	33,240
Land-based long-line fishery .	15,700	14,760
Pacific coastal fishery (Hokkaido)	4,500	4,000
Japan gill-net fishery	3,500	3,000
Subtotal	59,000	55,000
Grand total	115,000	110,000

Source: Suisan Keizai Shimbun, April 10, 1965.

Japan (Contd.):

Note: Agreement on a 1965 Japanese salmon catch quota of 115,000 metric tons in the western Pacific (off the coasts of Japan and the U.S.S.R.) was reached March 31, 1965, at the ninth annual meeting of the Northwest Pacific Fisheries Commission (Japan-U.S.S.R.). It provided for 56,000 tons in Area A (an increase of 1,000 tons from 1964) and 59,000 tons in Area B (an increase of 4,000 tons).

Note: See Commercial Fisheries Review, July 1964 p. 62.

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KING CRAB PRODUCTION AND PRICE TRENDS:

A possible shortage of export king crab packed in $\frac{1}{4}$-pound cans is reported in Japan. In view of this situation, Japanese trading firms are said to be asking packers that at least one-third of the pack which they consign to the Crab Sales Company be of the $\frac{1}{4}$-pound size. In fiscal year 1964 (April 1964-March 1965), canned king crab consigned to the Sales Company totaled 363,000 cases, including 62,000 cases of the $\frac{1}{4}$-pound pack. King crab offered by the Sales Company currently is quoted at US$28.15 a case for $\frac{1}{2}$-pound 48's and $16.90 a case for $\frac{1}{4}$-pound 48's. (Suisan Tsushin, April 8, 1965.)

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KING CRAB FLEETS DEPART FOR OKHOTSK SEA:

The four Japanese king crab factoryships (Yoko Maru, 5,763 gross tons; Kaiyo Maru, 5,549 gross tons; Hakuyo Maru, 6,430 gross tons; and Seiyo Maru, 6,404 gross tons) departed Hakodate for the Okhotsk Sea crab grounds on April 7, 1965. Their production quota is 60,000 cases (48 $\frac{1}{2}$-lb. cans) per fleet, a total of 240,000 cases. (Kanzume Nippo, April 12, 1965.)

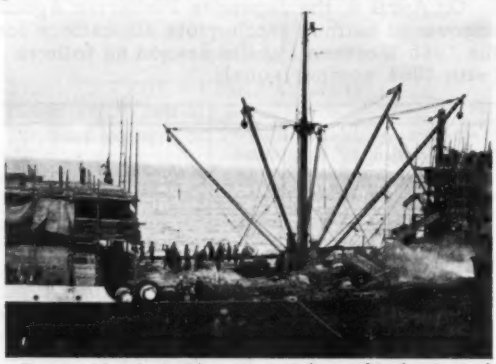

Fig. 1 - After deck of Japanese crab factoryship showing crab cookers (extreme right) and crew mending nets (center).

Fig. 2 - Processing crab meat aboard a Japanese crab factoryship.

Note: On March 24 agreement on the 1965 king crab quotas was reached for waters in the Sea of Okhotsk and the Bering Sea off Kamchatka by Japan and the U.S.S.R. at the ninth annual meeting of the Northwest Pacific Fisheries Commission. Japan's quota is 240,000 cases (48 $\frac{1}{2}$-lb. cans), a reduction of 12,000 cases from the previous year. The Soviet quota is 420,000 cases, or 42,000 cases more than in 1964.

Note: See Commercial Fisheries Review, May 1965 p. 53; Aug. 1964 p. 72; July 1964 p. 42.

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FISHING VESSEL OPERATIONS IN BERING SEA:

The Japanese 7,482-ton shrimp factoryship Einin Maru, accompanied by a fleet of 15 catcher vessels, was scheduled to depart for the eastern Bering Sea on April 14, 1965. The factoryship is scheduled to remain on the fishing grounds until September 20. Her production target is 180,000 cases (48 $\frac{1}{2}$-lb. cans) of shrimp and 1,000 tons of frozen products.

Fig. 1 - Japanese shrimp factoryship Einin Maru.

Japan (Contd.):

The combined total 1965 shrimp production target of the Japanese factoryships operating in the eastern Bering Sea is 390,000 cases (48 ½-lb. cans).

Fig. 2 - Japanese factoryship Tenyo Maru.

The 11,581-ton factoryship Tenyo Maru, accompanied by 10 catcher vessels, was scheduled to depart for the eastern Bering Sea on April 20. The factoryship is to fish mainly for Alaska pollock for conversion into minced fish. Minced fish meat made from Alaska pollock is used as an ingredient for fish cake and fish sausage. At present, there are 34 plants in northern Hokkaido (annual production capacity of 30,000 metric tons) engaged in the production of minced Alaska pollock meat. Their 1965 production target is 26,000 tons. (Suisan Tsushin, April 7, 1965.)

The 700-ton factoryship Kotoshiro Maru No. 15 departed Hachinohe, northern Japan, for the eastern Bering Sea on April 8.

The 10,357-ton fish meal factoryship Gyokuei Maru departed Hakodate, Hokkaido, for the eastern Bering Sea on April 9. (Suisancho Nippo, April 10, 1965.)

Note: See Commercial Fisheries Review, Mar. 1965 p. 81; Feb. 1965 p. 68.

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BERING SEA FISH MEAL PRODUCTION TARGET FOR 1965:

Seven Japanese factoryships operating in the eastern Bering Sea will be engaged in the production of fish meal this year. They are: Gyokuei Maru (10,357 gross tons); Hoyo Maru (14,000 gross tons); Soyo Maru (11,192 gross tons); Shikishima Maru (10,144 gross tons); Itsukushima Maru (5,889 gross tons); Tenyo Maru No. 3 (3,700 gross tons); and the Tenyo Maru (11,581 gross tons). Their combined production target is 41,000 metric tons of fish meal. Of the seven fleets, only Gyokuei Maru and the Hoyo Maru will be engaged on a full-time basis in meal production. In 1964, Japanese factoryships operating in the Bering Sea produced a total of 45,500 metric tons of meal. (Suisancho Nippo, April 8, 1965.)

Note: See Commercial Fisheries Review, Dec. 1964 p. 101; June 1964 p. 48, Mar. 1964 p. 60.

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FISH MEAL MARKET TRENDS:

The production of 5,600 metric tons of fish meal produced by the 14,000-ton Japanese fish-meal factoryship Hoyo Maru has been sold on the Japanese domestic market for 63,750 yen (US$177) a ton. In 1964 factoryship-produced fish meal sold for 60,500 yen ($168) a ton; in 1963 for 62,500 yen ($174).

The meal produced by the Hoyo Maru, which operated in the Okhotsk Sea, was processed from 36,300 metric tons of Alaska pollock supplied to the factoryship in February-March 1965 by Russian trawlers. The agreement establishing the joint enterprise extends for another two years. (Suisancho Nippo, April 9, 1965, and other sources.)

Note: See Commercial Fisheries Review, May 1965 p. 76; Mar. 1965 p. 83.

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FISH MEAL IMPORTS, FY 1965:

The Japanese Fisheries Agency on April 1 formally approved the importation of 148,000 metric tons of fish meal for Fiscal Year 1965 (April 1965-March 1966). This represents a substantial increase of 42,000 tons over FY 1964 imports, which totaled 106,000 tons. (Suisan Keizai Shimbun, April 3, 1965.)

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MACKEREL FISHING AND CANNING TRENDS:

As of March 31, 1965, the mackerel canners of the Choshi District (Chiba Prefecture, Japan) had packed 520,000 cases of mackerel, of which 100,000 cases were for export. This was a substantial reduction in pack as compared to the same period a year ago when they packed 630,000 cases, of which 185,000 cases were for export. Fishing prospects in

Japan (Contd.):

mid-April were reported poor due to a cold-water mass extending from off Choshi to Katsuura to the south. A considerable quantity of seine-caught mackerel was landed on April 9; the price ex-vessel was 22-23 yen a kilogram (US$55-58 a short ton), but due to their very small size and high price, the canners did not buy the fish. (Kanzume Nippo, April 8 & 10, 1965.)

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CANNED JACK MACKEREL PRICES:

The Japan Export Canned Sardine and Mackerel Sales Company has announced the following prices for canned jack mackerel:

Japanese Can Size	Equivalent U. S. Can Size	Price Per Case	
		Yen	US$
In tomato sauce:			
No. 1 oval 24's	1-lb. oval 24's	1,075	2.99
No. 3 oval 48's	½-lb. oval 48's	1,200	3.33
No. 1 small 100's	5-oz. tall 100's	1,870	5.19
No. 4 48's	1-lb. tall 48's	1,900	5.28
No. 6 48's	-	1,075	2.99
Natural:			
No. 3 oval 48's	½-lb. oval 48's	1,150	3.19
No. 1 small 100's	5-oz. tall 100's	1,700	4.72
No. 4 48's	1-lb. tall 48's	1,700	4.72

Source: Suisan Tsushin, March 30, 1965.

* * * * *

JAPANESE FIRM TO EXPERIMENT WITH BRINE-FREEZING SYSTEM ABOARD FISHING VESSELS:

A large Japanese fishing company plans to install a brine-freezing system (described as the "Okabe system") in the 99-ton vessel Asahi Maru on an experimental basis in fall 1965. If successful, the firm plans to gradually adopt it on other tuna vessels.

The "Okabe system" employs two 3-ton capacity freezing wells. Fish are dropped into one well through a chute and chilled in heavy brine solution at -22° C. (-7.6° F.) for 8 hours. The brine is then drained into the second well, after which the frozen fish are removed and stored in a nearby hold. The "Okabe system" reportedly will result in considerable saving of time and labor, eliminating the need for full-time refrigeration attendants inasmuch as regular deck hands can be used in their place. On a 500-ton vessel, this system reportedly will reduce manpower requirements by 5 men. The cost of the two brine wells is reported to be approximately 2 million yen (US$5,556). (Shin Suisan Shimbun Sokuho, March 27, 1965.)

* * * * *

EXPORTS OF FROZEN RAINBOW TROUT, JANUARY-FEBRUARY 1965 AND YEAR 1964:

The United States and the United Kingdom are the principal world markets for frozen rainbow trout exported from Japan. In January 1965, Japan's total exports of frozen rainbow trout amounted to 138 short tons valued at US$105,122, of which 54 percent in quantity and 56 percent in value were exported to the United States and 26 percent in quantity and 22 percent in value to the United Kingdom.

Although Japan's exports of frozen rainbow trout to all countries in January 1965 increased 18 percent in quantity and 3 percent in value from those in January 1964, purchases by the United States were down 13 percent in quantity and lower by 24 percent in

Japan's Exports of Frozen Rainbow Trout by Country of Destination, January 1965 with Comparisons

Destination by Country	February				Jan. 1965		Jan. 1964		Jan.-Dec. 1964	
	1965		1964							
	Short Tons	Value US$	Short Tons	Value US$	Short Tons	Value US$	Short Tons	Value US$	Short Tons	Value US$
United States	62	49,900	118	105,111	75	58,953	86	77,219	1,408	1,119,099
United Kingdom	46	30,861	35	26,444	36	23,967	19	14,506	418	285,288
Netherlands	-	-	-	-	5	3,719	-	-	-	-
Belgium	23	19,692	-	-	15	13,072	-	-	-	-
Canada	15	13,089	-	-	3	2,219	-	-	-	-
South Africa	-	-	-	-	2	1,203	-	-	-	-
Australia	5	4,508	-	-	2	1,989	-	-	-	-
Hong Kong	1	839	-	-	-	-	-	-	-	-
Sweden	3	2,100	-	-	-	-	-	-	-	-
West Germany	1	792	-	-	-	-	-	-	-	-
Italy	2	316	-	-	-	-	-	-	-	-
Other	-	-	34	26,967	-	-	12	10,725	340	278,889
Total	158	122,097	187	158,522	138	105,122	117	102,450	2,166	1,683,276

Note: Not shown separately for some countries prior to 1965.
Source: Japan Bureau of Customs.

Japan (Contd.):

value. Exports to the United Kingdom in January 1965 were up 88 percent in quantity and 65 percent in value as compared with the same month a year earlier.

Japan's exports of frozen rainbow trout in February 1965 of 158 short tons valued at US$121,997, increased 15 percent in quantity and 16 percent in value as compared with exports in the previous month. Exports to the United Kingdom increased 28 percent in quantity and 29 percent in value from January to February 1965. The February exports of that product to Belgium and Canada were higher than in January. Although shipments to the United States in February dropped 17 percent and 15 percent in quantity and value, respectively, it remained the principal buyer of Japanese rainbow trout. (Fisheries Attache, United States Embassy, Tokyo, March 29 and April 2, 1965.)

* * * * *

AIRCRAFT TO BE USED FOR FISH SPOTTING AND HYDROGRAPHIC OBSERVATIONS:

The Japan North Pacific Region Surrounding Net Council, which has been conducting aerial surveys of sea conditions off the northeastern coast of Japan for the past 11 years, plans to expand the area of investigation by employing a larger aircraft, the Cessna 182. The aircraft will be equipped with a special radiation water temperature meter (to be purchased from the United States) which will enable the taking of sea surface temperature measurements directly from the plane. In addition, the Cessna 182 will be used to conduct other hydrographic studies, such as current movements, and to search for fish concentrations. Data collected by the aircraft will be radioed to a relay station for transmission to fishing vessels via facsimile. (Suisan Keizai Shimbun, March 27, 1965.)

* * * * *

FISHERY LABOR CONDITIONS IN JAPAN:

The Japanese Fisheries Agency has compiled a report, "Survey of Fishery Labor Conditions in 1964"; it was prepared with a view toward contributing to the improvement in fishery labor. It discusses labor, employment, and wage conditions in the fishing industry. Based on a survey of 608 management units in 8 types of medium and small fisheries in 19 prefectures, some facts uncovered by the survey are: (1) wage structure even within the same type of fishery varies with managements and with locality (crew members in many regions receive base pay plus a share of the catch, but none works under a straight wage system); (2) monthly wages of those who made the most in 1963 were down but higher for those who were in lower income categories; and (3) recruitment of young workers is becoming an acute problem, as indicated by the fact that 84 percent of the fishery enterprises surveyed were experiencing varying degrees of difficulties in hiring young men. (Suisan Keizai Shimbun, April 9, 1965.)

* * * * *

FISHERIES RESEARCH PROGRAMS BEING CONSOLIDATED:

The Japanese Fisheries Agency is reorganizing and consolidating the research programs of the Agency's regional laboratories. Tuna research presently conducted by the Nankai Regional Laboratory in southern Japan, bottomfish studies conducted by the Tokai Laboratory in Tokyo, fur seal research carried out by the Tohoku Laboratory in northern Japan, and salmon research conducted by the regional laboratory in Hokkaido are being consolidated and will be conducted out of a new distant-water fisheries research laboratory now under construction in Shimizu, Shizuoka Prefecture, and scheduled for completion within the current fiscal year ending March 1966. Salmon research will continue to be conducted at the Hokkaido Laboratory but the program will organizationally be classified under distant-water research. (Suisan Tsushin, April 6, 1965, and other sources.)

Mexico

FISH CANNING CENTER AT ENSENADA EXPANDS:

The greater part of the canned fish production in Mexico originates in the Ensenada area of Baja California. The demand for canned fish in Mexico is growing rapidly, and canning capacity at Ensenada is being expanded.

A Mexico City firm has built a new modern anchovy canning plant just south of Ensenada. The new cannery first operated in August 1964 with a pack of 6,000 cases. When production

Mexico (Contd.):

is resumed this summer the new cannery is expected to produce an annual pack of 200,000 to 300,000 cases (100 4.5-oz. cans) of anchovy ("sardines") in tomato sauce or cottonseed oil. The new cannery should employ 250 persons during the anticipated 4-month season. Like other Ensenada canneries, the new cannery will market its entire production in Mexico.

Fig. 1 - General view of fishing vessels and boats in the harbor at Ensenada, Baja California.

Plant equipment at the new cannery is of United States and Swedish manufacture. The firm plans to add reduction machinery to make fish meal and oil from the waste.

Adjacent to the new cannery, a larger plant is being built by another firm to pack anchovies as well as fruit and vegetables.

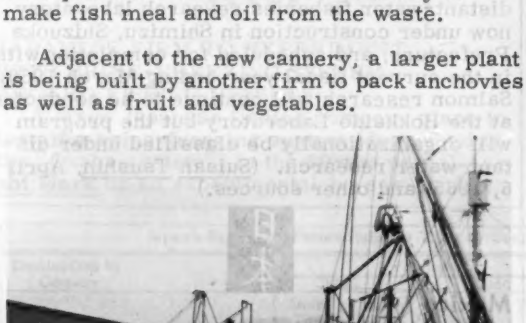

Fig. 2 - Purse seiners unloading sardines and mackerel at dock in Ensenada. Suction pumps are on floating barge between vessels. Belt conveyors carry fish to trucks for delivery to cannery. Vessel in foreground is brine-refrigerated.

In the same area is a new can manufacturing plant which will produce about 7 million sardine cans a year, all of which will be taken, at present, by one of the established canneries at Ensenada. Can-making equipment is of United States, German, and Spanish manufacture. Tinplate blanks are from the United States.

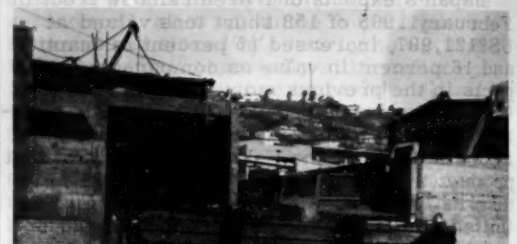

Fig. 3 - DUKW or amphibious "duck" delivering mackerel to cannery in Ensenada. Purse seiners lie at anchor in harbor, unload fish into the "duck," and it runs on the beach and along the streets to the canneries. The three smaller canneries in Ensenada receive their fish deliveries in this way.

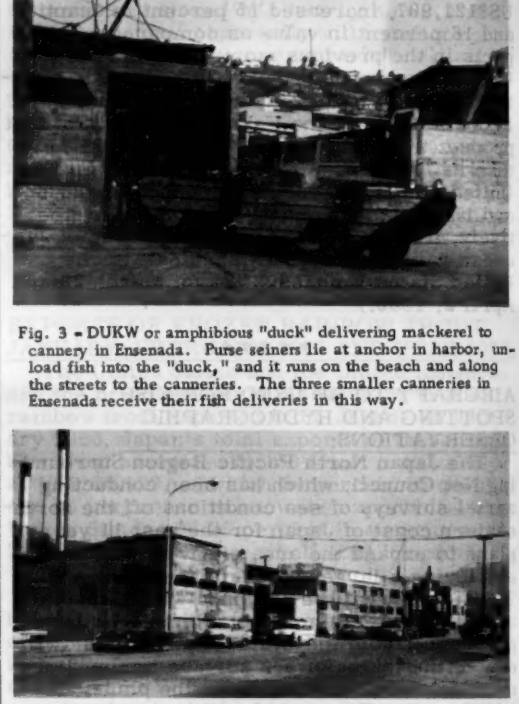

Fig. 4 - Two canneries in Ensenada that pack mackerel and sardines.

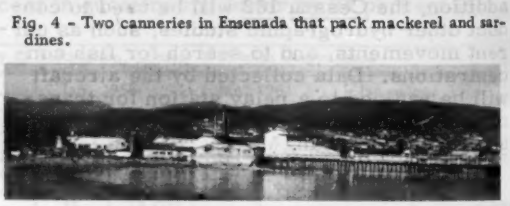

Fig. 5 - Large cannery located about 5 miles out of Ensenada. Cans sardines, mackerel, tuna, and also tomato products.

Addition of the two new packing plants to the several already operating will solidfy Ensenada's position as Mexico's leading seafood canning center. (United States Embassy, Mexico, D. F., April 3, 1965, from information supplied by Consulate General, Tijuana.)

Morocco

FISH PROTEIN CONCENTRATE FOR HUMAN CONSUMPTION:

Fish protein concentrate or fish flour is to be produced on a commercial scale in Morocco at a plant being built at Agadir by the National Society of Comestible Flour from Fish (SONAFAP). The project is a joint enterprise of private capital and the Moroccan Government.

The new factory is expected to use 50 metric tons of fresh sardines a day and produce 300 to 400 tons of concentrate during the 220 days of the fishing season in the region of Agadir. The plant will employ about 200 seasonal and 20 permanent employees. The production of the plant could be quickly doubled with a small additional investment, according to reports.

Morocco may provide an interesting test as to whether fish protein concentrate can be marketed in a tradition-oriented society. (United States Embassy, Rabat, March 10, 1965.)

Mozambique

FISHERIES ENTERPRISE BEING DEVELOPED BY PORTUGUESE-SOUTH AFRICAN GROUP MAY HELP MODERNIZE FISHING INDUSTRY:

A freezing and canning plant to handle shrimp and possibly other fishery products is being established at Porto Amelia in northern Mozambique by a firm representing interests in Portugal and the South Africa Republic.

The group is also sponsoring fisheries exploration--mainly for shrimp--off the east coast of Africa. The explorations were started in late 1964 and are being conducted by two trawlers supplied under an arrangement with a French firm. (The same French firm may also furnish marketing and other technical assistance.) Early in March 1965, one of the exploratory trawlers reported a shrimp catch of 800 kilos (1,764 pounds) in 4 hours.

The new enterprise may help modernize Mozambique's fishing industry which in 1962 had only 92 motor-powered vessels in its fishing fleet of 7,965 small fishing craft. Landings in Mozambique in 1962 totaled only 3,256 metric tons consisting of 2,429 tons of fish, 409 tons of shrimp, 160 tons of cockles, and 258 tons of other fishery items. To supplement the domestic catch, Mozambique imports about US$2.1 million worth of dried fish annually from Portugal and a small amount of frozen fish from South Africa.

In early 1965, a representative of the Portuguese-South African group said the Port Amelia plant should be ready in early summer 1965 to begin processing frozen shrimp for

Typical fish boats still used at Lourenco Marques.

Mozambique (Contd.):

marketing in the United States and South Africa. Although the plant will concentrate on shrimp initially, it has been designed to handle up to 70 tons of varied fish landings a day, according to reports. Investment in the project was thought to have reached $1 million by early 1965.

The Portuguese-South African group may establish a number of other plants on the Mozambique coast to process fishery products (such as shrimp, lobster, crab, tuna, bonito, and pilchard).

Freezing and cold-storage plants with capacities up to 100,000 tons have also been mentioned in their plans. Although the group is primarily interested in exports, such facilities would also aid domestic fish marketing in Mozambique.

In early 1965, the fishing fleet of the Portuguese-South African group included two vessels purchased from Angolan firms and a South African motor launch, in addition to the two vessels chartered from the French firm. The vessels ranged from 48 to 67 feet in length. Several more vessels have been ordered by the group which has plans for a fishing fleet of up to 29 vessels. The group also has an airplane which can be used for fish spotting. (Regional Fisheries Attache for Africa, United States Embassy, Abidjan, March 22, 1965, and United States Consul, Lourenco Marques, April 6, 1965.)

New Zealand

TUNA FISHERY DEVELOPMENT PROGRAM INITIATED:

The Government of New Zealand earlier this year approved plans of the Fishing Industry Board for experimental work in the development of tuna fishing in New Zealand offshore waters. A subcommittee of the Board, consisting of an equal number of members from the Fishing Industry Board and the New Zealand Marine Department is responsible for the operation of this experimental project and has already done much to implement its plans.

An official statement issued jointly by New Zealand's Minister of Marine and the Chairman of the Fishing Industry Board said, "The first stage of a combined Marine Department and Fishing Industry Board tuna development project commenced in the first week of February (1965) in the Gisborne/Tauranga area.

"The objective of the 4 to 6 weeks' experimental tuna fishing program is to compare the effectiveness and economics of different methods of tuna fishing under commercial conditions. The four methods to be used are monofilament gill-netting, live-bait pole fishing, long-lining, and possibly purse-seining.

"Planning for the project is in the hands of a joint committee set up by the board, comprising representatives of the Marine Department and the Fishing Industry Board."

It was hoped at the time the statement was issued that an experienced live-bait pole fisherman would be brought to New Zealand from Australia to run the pole-fishing vessel so that New Zealand skippers and crews who had training during Japanese fishing demonstrations would run the vessels using the other three methods under direct supervision of Japanese experts.

The official statement added, "It is planned to use aircraft for tuna spotting and use will be made of modern electronic fish-finding equipment. Tuna is known to exist in New Zealand waters and February is normally a good month for sightings in the proposed experimental fishing area."

The joint project between the industry and the New Zealand Marine Department is expected to be a forerunner for future coordinated efforts to develop New Zealand's fishing resources.

If the project shows that tuna can be taken economically in commercial quantities, further active steps will be taken by the Board and the Marine Department to develop tuna fishing as an important aspect of New Zealand's fishing industry. (New Zealand Commercial Fishing, February 1965.)

Note: See Commercial Fisheries Review, October 1964 p. 73.

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FIFTY YEARS OF WHALING COMES TO AN END:

New Zealand whaling came to an end in 1964 when its last whaling station closed down after half a century of operations. The reason: economics.

New Zealand (Contd.):

New Zealand whalers had traditionally hunted the humpback whale and in 1960 caught 226--an all-time record. But in 1961 the catch dropped to 55 and in 1962 to only 27.

With the collapse of humpback whaling, one of the two New Zealand whaling companies closed down. But the other firm decided to hunt sperm whales, never before exploited by New Zealanders. They were successful at first and in 1963 took 201 sperm whales with the aid of spotting aircraft and modern techniques.

But success was short-lived. Not only did competition from Soviet whalers develop off New Zealand, but world demand for whale oil fell and prices dropped. Despite Government guarantees to cover operating costs, the New Zealand station found it could no longer make a profit and closed down. (Foreign Trade, Canadian Department of Trade and Commerce.)

Note: See Commercial Fisheries Review, Sept. 1964 p. 85.

Nicaragua

SHRIMP FISHERY TRENDS:

Shrimp are caught on both the Pacific and Caribbean coasts of Nicaragua, with landings in 1962 totaling an estimated 3.5 million pounds. Although about half the catch is from the Pacific area, the Caribbean fishery is growing more rapidly.

The large shrimp-processing plant at El Bluff in southeastern Nicaragua, which is operated by a United States firm, is working at capacity and is planning to expand. The plant facilities are modern, clean, and efficient. Most of the output consists of peeled and deveined, individually frozen pink shrimp counting 20-30 to the pound; "broken" shrimp are bulk-packed and frozen. The plant has a large storage capacity for holding shrimp until they can be shipped to the United States. The present fleet, which is owned by the United States firm and is to be enlarged, consists of 38 vessels, mostly old vessels from Gulf of Mexico ports. An additional 12 vessels are fishing for a nearby plant at La Nica. A total of 70 fishing vessels is reported to be operating in the area.

A large canoe fishery is conducted in the bay at El Bluff. The canoes, some of which are motorized, carry a crew of 2 or 3 men, using cast nets. A buyer selects the best quality large shrimp from the canoe landings for resale to the processing plant and the remainder is sold in the local market or in Managua.

Note: See Commercial Fisheries Review, January 1964 p. 65.

Norway

PRELIMINARY REPORT ON EXPORTS OF CANNED FISH IN 1964:

Exports of all the principal Norwegian canned fishery products during January 1-November 28, 1964, were larger than in the same period of 1963. Exports of canned brisling showed the greatest increase.

Norwegian Exports of Principal Canned Fishery Products

Product	1/Nov. 28, 1964	Nov. 23, 1963
	. . . (Metric Tons). . .	
Brisling	5,843	4,837
Small sild	13,421	12,930
Kippered herring	3,049	2,818
Soft herring roe	1,112	684
Sild delicatessen	554	476
Shellfish	1,555	1,435

1/Preliminary.

The packing of sild sardines in 1964 started in early May and by December 26, 1964, a total of 872,057 standard cases of small sild had been packed, compared with 970,000 cases in the same period of 1963. Most of that pack was smoked sild. (Unsmoked sild accounted for only 56,519 cases of the 1964 pack and 64,262 cases of the 1963 pack.) As of December 26, the 1964 exports of canned sild sardines totaled 875,315 standard cases as compared with 911,645 cases in the same period of 1963.

As usual, the brisling canning season closed October 15. The 1964 brisling pack totaled 378,719 standard cases, compared with 282,160 cases in 1963. The 1964 brisling pack would have been even larger if additional supplies had been available. According to preliminary data, Norwegian exports of canned brisling in 1964 totaled 412,474 standard cases as compared with 305,695 cases in 1963. One factor behind the increase

Norway (Contd.):

in exports was the advertising allocation of Kr. 2,5 (35 U.S. cents) per standard case of brisling set aside by Norwegian canners in 1964.

The Norwegian pack of canned kippered herring in 1964 totaled 213,000 cases, an increase of 55,000 cases from 1963 but a decline of 156,695 cases from 1962.

Norwegian production of canned crab and canned anchovies showed a small increase in 1964, while the output of canned shrimp and sild delicatessen showed some decline in 1964.

For January to October 1964, Norwegian total canned fishery exports of 25,645 tons were valued at Kr. 128.8 million (US$18.0 million), compared with 23,024 tons valued at Kr. 116 million ($16.2 million) in the same period of 1963.

The United States was the main market for Norwegian exports of canned fishery products in January-October 1964 with 8,354 tons valued at Kr. 45 million ($6.3 million), followed by the United Kingdom with 6,444 tons valued at Kr. 35 million ($4.9 million). Other markets were the South Africa Republic with 1,525 tons, Australia with 1,519 tons, Czechoslovakia with 1,089 tons, and Canada with 744 tons.

With the exception of sales to the United States, canned fish deliveries to all major markets in January-October 1964 were running ahead of the same period in 1963. Shipments to the United Kingdom were up 1,408 tons and Kr. 9 million ($1.2 million). The decline in shipments to the United States was 1,355 tons in quantity and Kr. 5.9 million ($824,000) in value. The decline in exports to the United States was due mainly to smaller shipments of canned brisling in oil and canned sild in oil.

Although exports of canned fishery products increased in 1964, Norwegian canners report that profit margins have been reduced as a result of rising costs for wages and raw material. Competition abroad is said to be tightening, particularly in countries with lower production costs.

Norwegian canners are also concerned about the outlook for sales to the European Common Market, which is designed to give intra-Community trade a preference over shipments from outside countries such as Norway.

On the other hand, Norwegian exports benefit from tariff reduction in the European Free Trade Association (EFTA). Part of the increase in exports to the United Kingdom was due to the fact that canned brisling ordered in 1963 was shipped early in 1964 to benefit from EFTA year-end tariff cuts. (Norwegian Canners Export Journal, February 1965.)

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FISHERIES LANDINGS, 1962-1964:

Norwegian fisheries landings in 1964 totaled 1.4 million metric tons with an ex-vessel value of Kr. 777 million (US$109 million), up 19 percent in quantity and 11 percent in value from 1963. Sharply higher landings of winter herring and trawl herring accounted for most of the increase. Those gains more than offset a considerable decline in landings of fat herring, small herring, and cod.

Norwegian vessels fishing for cod on the Lofoten fishing grounds. Photo taken in 1950.

A heavy run of herring off the Lofoten area of northern Norway contributed to the striking recovery of the winter herring fishery. The sharp fluctuations in Norwegian fisheries reflect the country's heavy dependence on coastal fisheries.

The cod fishery off northern Norway has declined steadily in recent years and the trend continued in 1964. The capelin (smelt) fishery continued at a relatively low level. (Capelin landings totaled over 200,000 tons in 1961, but the fishery was almost wiped out in 1962 when capelin failed to seek Norwegian waters.) Landings were also down in 1964 for haddock, Norway pout, and dogfish. On the other hand, landings were up substantially for saithe and mackerel.

Norway (Contd.):

Norwegian Fisheries Landings, 1962-1964

Species	1/ 1964			1963			1962		
	Quantity	Value		Quantity	Value		Quantity	Value	
	Metric Tons	Kr. 1,000	US$1,000	Metric Tons	Kr. 1,000	US$1,000	Metric Tons	Kr. 1,000	US$1,000
Fish:									
Herring:									
Winter	286,254	69,849	9,755	61,509	25,169	3,515	84,068	32,115	4,485
Fat	56,576	16,100	2,249	143,813	43,648	6,096	171,267	45,202	6,313
Small	106,113	24,579	3,433	172,787	35,598	4,972	136,165	31,844	4,447
Fjord	1,016	857	120	1,321	1,096	153	2,701	2,282	319
Trawl	186,132	63,397	8,854	32,419	12,548	1,752	12,510	4,851	678
Iceland	91,620	38,122	5,324	98,133	40,830	5,702	152,199	59,000	8,240
Sprat	10,174	9,737	1,360	16,602	10,495	1,466	10,596	11,542	1,612
Total herring	737,885	222,641	31,095	526,584	169,384	23,656	569,506	186,836	26,094
Cod:									
Spawning	47,276	53,192	7,429	58,255	60,514	8,452	68,270	65,867	9,199
Finmark	19,329	21,209	2,962	35,495	32,002	4,470	31,218	26,126	3,649
Other	93,801	107,806	15,057	97,790	103,209	14,415	100,789	95,218	13,299
Total cod	160,406	182,207	25,448	191,540	195,725	27,337	200,277	187,211	26,147
Capelin (smelt)	19,625	2,734	382	28,338	2,181	305	363	62	9
Salmon and sea trout	1,600	20,000	2,793	1,553	19,320	2,698	1,671	21,511	3,004
Halibut 2/	3,594	14,623	2,042	3,794	15,422	2,154	4,687	16,569	2,314
Cusk	19,641	20,352	2,842	17,505	16,012	2,236	16,726	14,043	1,961
Haddock	34,695	34,528	4,822	46,412	40,811	5,700	41,694	34,980	4,885
Norway pout	93,337	16,697	2,332	106,482	18,637	2,603	40,751	7,138	997
Saithe	143,562	78,120	10,910	107,627	62,829	8,775	83,165	44,689	6,241
Ling 3/	13,125	20,145	2,814	10,924	13,573	1,896	10,556	11,833	1,653
Mackerel	47,712	22,741	3,176	24,114	16,739	2,338	16,955	13,282	1,855
Tuna	1,137	2,700	377	130	303	42	6,794	13,486	1,883
Dogfish	25,343	15,704	2,193	30,810	16,089	2,247	28,682	14,026	1,959
Porbeagle	5,264	18,186	2,540	4,554	13,670	1,909	1,771	5,302	741
Other fish 4/	57,314	38,832	5,423	45,296	30,594	4,273	45,324	27,047	3,778
Total fish	1,364,240	710,210	99,189	1,145,663	631,289	88,169	1,068,922	598,015	83,521
Fish livers & roe	17,917	9,826	1,372	18,651	8,888	1,241	20,607	10,245	1,431
Shellfish:									
Shrimp	11,047	44,438	6,206	11,729	46,169	6,448	10,908	42,619	5,952
Lobster	376	7,502	1,048	502	8,725	1,219	555	8,516	1,189
Crab	3,943	2,689	376	3,593	2,750	384	3,557	2,623	366
Squid	1,500	450	63	860	226	32	6,018	1,981	277
Total shellfish	16,866	55,079	7,693	16,684	57,870	8,083	21,038	55,739	7,784
Seaweed, dried	12,000	2,200	307	8,668	1,620	226	13,405	3,254	454
Total landings	1,411,023	777,315	108,561	1,189,666	699,667	97,719	1,123,972	667,253	93,190

1/Preliminary.
2/Does not include the lower-valued "Greenland halibut."
3/Does not include "blue ling."
4/Mostly "Greenland halibut," "blue ling," plaice, pollock, ocean perch, wolffish, eel, and sand eel.
Note: Norwegian kroner 7.16 equal US$1.00.
Source: Norwegian Fishing and Maritime News, No. 4, 1965.

In 1964, Norwegian shellfish landings--mainly shrimp, lobster, and crab--continued at the rather modest level of past years.

Note: See Commercial Fisheries Review, May 1963 p. 79.

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ANTARCTIC WHALE OIL PRODUCTION, 1964/65:

At the conclusion of the 1964/65 Antarctic whaling season, Norway's 4 expeditions had processed a total of 232,500 barrels of whale and sperm oil (38,750 tons), as against 252,740 barrels (42,143 tons) during the preceding season. (A decade ago in 1955, Norway had 10 Antarctic expeditions which produced 852,000 barrels of oil.) Whale oil production dropped to about 175,000 barrels (29,166 tons), as compared to approximately 202,500 barrels in the 1963/64 season. The production of sperm oil rose from 50,273 to 57,460 barrels (9,576 tons).

The output of the Norwegian expeditions in 1964/65 was very uneven. Two of the expeditions actually surpassed their production in 1963/64, but the other two expeditions lagged far behind.

Norway (Contd.):

During the 1964/65 Antarctic season, the Norwegian catch consisted mainly of sei whales. Fin whale stocks appear to be rapidly diminishing, while blue whales are virtually extinct.

The value of the oil processed by the Norwegian expeditions during the 1964/65 Antarctic season is estimated at about 60 million kroner (US$8.4 million), which includes Kr. 50 million ($7.0 million) for whale oil and Kr. 10 million ($1.4 million) for sperm oil. The possible value to Norwegian expeditions of other byproducts of 1964/65 whaling (meat, meal, and meat extract) was estimated at Kr. 90 million ($12.6 million) by the newspaper Tonsbergs Blad.

The 4 Norwegian expeditions had a total complement of 1,857 officers and men when they set off for the Antarctic last fall. As recently as the 1958/59 season, 6,817 Norwegians manned whaling ships. (News of Norway, April 22, 1965.)

Note: See Commercial Fisheries Review, April 1964 p. 68.

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SUPPLY AND DISPOSITION OF MARINE OILS, 1964 WITH COMPARISONS:

Norway's production of marine oils in 1964 consisted mainly of herring oil (80,000 metric tons) and fish-liver oil (10,000 tons), plus Antarctic sperm oil (8,546 tons) and whale oil (34,419 tons).

Table 1 - Norwegian Production of Marine Oils, 1962-1964

Item	1964 1/	1963 2/	1962
	(Metric Tons)		
Cold-cleared cod-liver oil	10,000	4,100	5,500
Other fish-liver oils		6,100	1,000
Herring oil	80,000	55,000	61,000
Total fish and fish-liver oils	90,000	65,200	67,500
Seal oil	2,500	2,000	2,800
Sperm oil:			
Antarctic	8,546	7,378	12,020
Shore stations (Norway)	363	916	687
Total sperm oil	8,909	8,294	12,707
Whale oil:			
Antarctic	34,419	31,423	85,015
Shore stations (Norway)	262	209	847
Total whale oil	34,681	31,632	85,862
Total marine oils	136,090	107,126	168,869

1/Preliminary.
2/Revised.

Herring oil production in 1964 was up 45 percent from the previous year due mainly to sharply higher landings of winter herring and North Sea trawl herring. It is estimated that the Norwegian fish meal and oil industry absorbed over 75 percent of Norwegian herring landings in 1962-1964. (Norwegian herring meal production was up 41 percent in 1964.) The 1965 outlook for the Norwegian herring reduction industry is promising since the year began with an excellent winter herring catch.

Norwegian production of Antarctic whale and sperm oil in 1964 showed some increase over the previous year, but 1964 output was down sharply from that of 1962, and the outlook for 1965 is for even lower production since Norway failed to meet its catch quota during the 1964/65 Antarctic season.

Table 2 - Norwegian Supply and Disposition of Crude Whale and Herring Oil, 1962-1964

	1/ 1964	2/ 1963	1962
	(Metric Tons)		
Supply:			
Stocks, January 1	60,129	71,336	54,163
Production:			
Whale oil	34,681	31,423	85,864
Herring oil	80,000	55,000	61,000
Total production	114,681	86,423	146,864
Imports:			
Whale oil	2,100	11,715	1,674
Herring oil	75,430	53,278	51,858
Total imports	77,530	64,993	53,532
Total supply	252,340	222,752	254,559
Disposition:			
Exports:			
Whale oil	16,150	25,631	65,948
Herring oil	810	98	125
Total exports	16,960	25,729	66,073
Processed by hardening industry 3/	150,166	136,894	117,150
Stocks, December 31	85,214	60,129	71,336

1/Preliminary.
2/Revised.
3/The data are arrived at by deducting year-end stocks and exports from total supply; the export figures are complete but the year-end stocks may include oil not included in the production figures.

The Norwegian supply of marine oils in 1964 was increased not only by higher domestic production but also by much larger imports of herring oil. The gain was only partly offset by lower whale oil imports. Since marine oil exports from Norway declined in 1964, it is assumed that much of the increased supplies went to the domestic hardening and refining industry. Carryover stocks were also up on December 31, 1964.

Norwegian imports of all types of marine oil (mainly herring oil) in 1964 totaled 85,474 tons valued at 118.1 million kroner (US$16.5

Norway (Contd.):

million). The leading supplier was Iceland with 44,189 tons valued at Kr. 62.3 million ($8.7 million), followed by the United States with 14,119 tons valued at Kr. 19.2 million ($2.7 million), and West Germany with 10,594 tons valued at Kr. 13.7 million ($1.9 million).

Norwegian exports of all types of marine oils in 1964 totaled 47,367 tons valued at Kr. 75.9 million ($10.6 million). The leading buyer was the United Kingdom with 10,696 tons, followed by West Germany with 6,175 tons, the Netherlands with 5,851 tons, and the United States with 4,998 tons. (Foreign Agricultural Service, United States Embassy, Copenhagen, March 22, 1965.)

Note: See Commercial Fisheries Review, July 1964 p. 71.

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GOVERNMENT-INDUSTRY FISHERIES AGREEMENT AIMS TO ELIMINATE PRICE SUBSIDIES BY 1968:

In Norway, a General Agreement on State support and other measures to increase fishermen's income was concluded between the Ministry of Fisheries and the Fishermen's Association (Norges Fiskarlag) on June 3, 1964, and approved by the Norwegian Parliament on January 12, 1965.

The General Agreement, which aims at making the Norwegian fishing industry independent of price subsidies by 1968, contains the following main provisions:

1. Negotiations on subsidies and other support measures for the fishing industry will take place between the Ministry of Fisheries and the Fishermen's Association, the latter acting as the sole representative of the fishermen.

2. The Fishermen's Association may request negotiations for support measures when the profitability "under normal fishing conditions" for "averagely well operated and well equipped vessels" engaged in fishing on a full-time basis is not in "reasonable proportion" to the incomes in other jobs. Negotiations may also be requested for temporary support measures when the difficulties are due to "structural factors."

3. The main emphasis should be on support measures which can make fishing, production, and marketing more effective and promote rational development generally in the industry.

4. Government funds shall be allocated for special loans to qualified fishermen who want to acquire vessels suitable for the coastal fishing banks and for offshore fishing.

5. The State Fisheries Bank should have sufficient resources available for short-term credit for modernization of the fishing fleet.

6. With regard to social measures, the negotiations should aim at allocation of a portion of total State support for the industry to a social fund to cover part of the premium payments for social security.

7. Price subsidies will be gradually eliminated by the end of 1968, provided other development measures result in a reasonable increase in fishermen's income. (United States Embassy, Oslo, February 15, 1965.)

(Editor's Note: Of interest--in view of the Norwegian proposals--is the position on fishing industry subsidies adopted at the June 1964 meeting of the Fisheries Committee of the Organization for Economic Cooperation and Development (OECD). The Fisheries Committee of OECD made a distinction between justifiable subsidies and those which should be eliminated.

According to a statement issued July 21, 1964, by the Council of OECD, juistifiable subsidies include those which "may be necessary for developing the fishing industry and raising its productivity or for facilitating the alternative employment of fishermen."

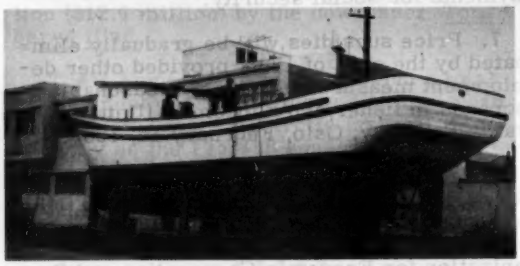
On the other hand, OECD condemned "catch premiums and subsidies given to fishermen on the basis of the quantity of fish landed, gross proceeds, or time spent at sea." Referring to that class of subsidies, OECD said: "Such schemes should only be introduced by way of exception and for a period not exceeding 3 years. In those countries where such subsidies have been made for more than 5 years, the aim should be to reduce them gradually with the object of abolishing them within 10 years." OECD recommended the eventual total abolition of such subsidies because they have too great an influence on foreign trade.)

Note: See Commercial Fisheries Review, April 1965 p. 80, and Oct. 1964 p. 48.

Peru

FISH MEAL OUTPUT CONTINUES HEAVY IN SPITE OF FISHING UNCERTAINTIES IN MARCH 1965:

Peruvian fishing turned erratic in March 1965 when warm water moved into the normally cold anchoveta fishing grounds. However, Peruvian output of fish meal exceeded 94,000 metric tons during the first half of March. Despite high production in early March, prices remained firm to strong. In early April 1965, Peruvian fish meal for May delivery was quoted at US$128 f.o.b. Peruvian ports. Prices for delivery later in the year were reported to be well above that level with very little offered.



A typical anchoveta boat about ready for launching at Callao in 1962.

The warm water pushing into the anchoveta grounds is driving fish deeper and also closer toward shore. This shoreward concentration of fish may have helped the fishermen, but they have also had to go deeper to get their catches. Birds which depend on anchoveta for food cannot get at the fish as easily. Anticipating a reduction in guano output, fertilizer producers have called for reduced fishing pressure.

Whether the intrusion of warm water will have any dramatic effect on fish meal production is still uncertain. Scientists at the Peruvian Marine Institute are watching developments closely. (United States Embassy, Lima, April 8, 1965.)

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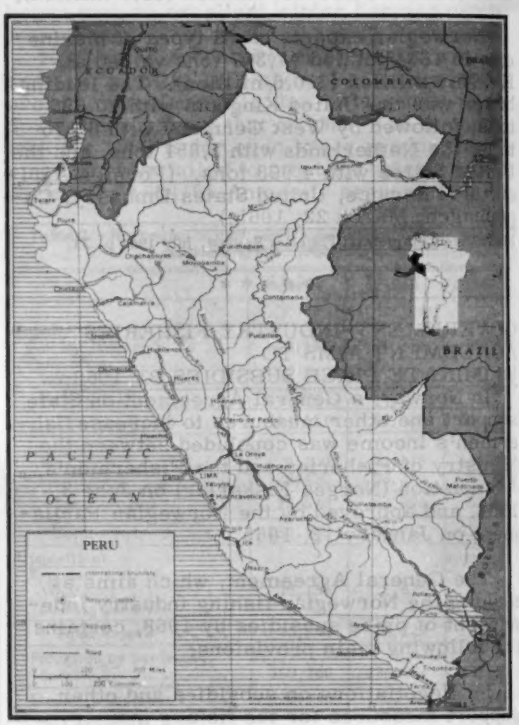
FISH MEAL PRODUCTION TRENDS AND OUTLOOK, EARLY 1965:

In spite of a 3-week fishermen's strike at Chimbote in February 1965, Peruvian fish meal output in the first 2 months of 1965 was almost equal to the record production in the first 2 months of 1964. (Editor's Note: Peruvian fish meal production in January-February 1965 totaled 313,100 metric tons as compared with 320,600 tons in the same period of 1964, according to reports in Oil World Weekly, February 19 and March 12, 1965.) Without the strike, production in early 1965 would probably have run about 10 to 15 percent ahead of last year.

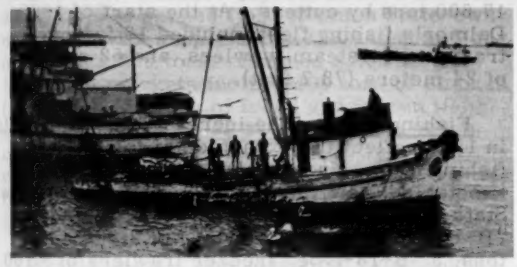


The 1965 production outlook is obscured by two factors. First, there is the possibility that heavy fishing pressure may have affected anchoveta spawning stocks. Second, there are unusual oceanographic factors such as the large body of warm water (known as a "nino") which is pushing its way southeastward into anchoveta grounds.

Scientists at the Peruvian Marine Institute will be better able to determine the effects of overfishing (if any) after the normal seasonal anchoveta catch decline in late May. The effects of the warm water moving in are more difficult to evaluate. For the present, the nino seems to have pushed the fish closer to shore where the water is cooler. The resultant concentration of anchoveta has, if anything,

Peru (Contd.):

improved fishing. Efforts are now under way to determine the extent of the nino, its source and direction of movement, and its future effect on fishing conditions.



Anchoveta boat waiting to unload at Chimbote.

Peruvian firms supplying machinery to the local fish meal industry are given excessive tariff protection, according to the Peruvian National Fisheries Society. This results in excessive costs and works a special burden, the Society alleges, on export producers who cannot pass the higher costs along in higher prices. Noting that the Peruvian Industrial Promotion Law under which special tariff increases are granted calls only for "adequate" protection, the fisheries organization has asked the Peruvian National Industrial Society for help in seeing to it that protection granted is consistent with the intent of the law. (United States Embassy, Lima, March 25, 1965.)

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FISH MEAL INDUSTRY TRENDS IN 1964 AND OUTLOOK FOR 1965:

Peruvian fisheries in 1964 were marked by a record catch of almost 9 million metric tons (mostly anchoveta), record fish meal production of over 1.5 million tons, and record fish meal exports of 1.4 million tons valued at US$143 million. In spite of the tremendous gain in output, prices for fish meal remained firm throughout the year.

It is estimated that the Peruvian industry was working at only 65 percent of capacity while producing its record output in 1964.

A regional breakdown of Peruvian fish meal exports in 1964 shows Western Europe as the leading buyer with about 57 percent of the total, followed by North America with 22 percent, the Soviet Bloc with 9 percent, the Far East with 7 percent, and Latin America with about 5 percent. As in the past, the three largest markets for Peruvian fish meal in 1964 were the United States, West Germany, and the Netherlands. Peruvian shipments to most foreign markets were up in 1964, and there was a sharp increase in shipments to West Germany, the United States, and the United Kingdom.

(Editor's Note: According to Oil World Weekly, Peruvian fish meal shipments to certain leading buyers in 1964 and 1963 were as follows:

	1964	1963
	(1,000 Metric Tons)	
West Germany	308.2	203.8
United States	299.7	250.0
Netherlands	192.8	181.3
Japan	89.8	70.0
United Kingdom	83.7	49.2
Italy	82.4	62.9
France	50.1	46.3
Spain	38.0	76.4
Belgium	35.2	30.6
East Germany	41.2	42.6
Poland	27.2	9.8
Yugoslavia	23.4	31.0
Sweden	21.1	15.6
Mexico	35.9	27.8
Venezuela	20.4	5.9

Oil World Weekly reported Peruvian fish meal stocks at the end of 1964 as 260,500 tons; Peruvian fish meal production in January-February 1965 as 313,100 metric tons; and Peruvian fish meal exports in January-February 1965 as 294,900 tons.)

Outlook for 1965: In the Peruvian fish meal industry, price prospects are bullish while the production outlook is uncertain. Peruvian sellers reportedly slowed commitments in the spring of 1965 in order to build inventories for sale later in the year when production declines seasonally. Spot prices in the spring of 1965 were running upward from $115 f.o.b. Peruvian ports. How far prices can rise without the threat of buyers turning to substitute sources is a subject of disagreement.

Informed observers estimate that Peruvian fish meal production in 1965 will fall somewhere between the 1963 and 1964 levels, that is between 1.1 and 1.5 million tons.

Scientists at the Peruvian Marine Institute have pieced together tentative indications that the intensity of fishing effort may be cutting into anchoveta spawning stocks. The effects of overfishing (if any) are expected to be much

Peru (Contd.):

clearer after the normal seasonal anchoveta catch decline in late May.

The effect of a large body of warm water moving into the anchoveta grounds is also uncertain. (United States Embassy, Lima, April 11, 1965.)

Poland

FISHERIES GOALS, 1965:

Landings: The Polish fisheries catch target in 1965 is 270,000 metric tons, up 47,000 tons from the target in 1964. Atlantic fisheries--with a 72-percent increase in catch goal--have the major responsibility for heavier landings. Increased catches are planned in the northwest Atlantic as well as off the African west coast. The Baltic Sea catch target was raised 8 percent, and the North Sea target was raised 7 percent (see table). Considerably heavier landings of ocean perch, cod, and North Sea herring are called for in 1965. Most of the overall increase in landings is to be achieved by State-owned fisheries.

Polish Fisheries Catch Goals, 1964-1965

Item	1965	1964
	. . . (Metric Tons) . . .	
Catch Goals by Fishing Areas:		
Atlantic area	81,000	47,000
Baltic Sea	98,000	91,000
North Sea	91,000	85,000
Total catch goal	270,000	223,000
Catch Goals by Fishing Groups:		
Private fisheries	16,000	16,000
Cooperative fisheries	27,000	23,000
State-owned fisheries	227,000	184,000
Catch Goals for Leading Species 1/:		
Cod	75,000	64,000
Ocean perch	29,000	12,300
Herring:		
North Sea	83,000	76,000
Baltic Sea	24,500	22,000
Sprat	16,500	14,000
Mackerel	2/	13,000
Flatfish	2/	4,700
Salmon and trout	400	275

1/Does not include catch goals for all species.
2/Not available.
Note: Data shown for both 1964 and 1965 are catch goals. Actual landings in 1964 are not yet available.

An important part of the State-owned fisheries catch goal of 227,000 tons in 1965 has been assigned to the reorganized "Dalmor" group. (At the start of 1965, two State-owned fishery enterprises, "Arka" and "Dalmor" of Gdynia, were combined into one group known as "Dalmor." The new Dalmor group is to land a total of 97,600 tons of fish in 1965 from its overall fishing operations in the northwest Atlantic, North Sea, and Baltic Sea. Of that total, 52,900 tons are to be landed by factory trawlers, 27,100 tons by steam trawlers, and 17,600 tons by cutters. At the start of 1965, Dalmor's fishing fleet included 10 factory trawlers, 31 steam trawlers, and 52 cutters of 24 meters (78.7 feet).

Fishing Fleet: The increased landing goals in 1965 reflect the expansion of the Polish fishing fleet. Under current construction timetables, new vessels to be delivered to the State-owned fisheries in 1965 will include 4 "B-15-type" factory trawlers of 2,890 gross tons, 5 "B-18-type" freezer trawlers of 3,100 gross tons, 2 "B-23-type" freezer trawlers of 1,160 gross tons, and six 24-meter (78.7-foot) cutters. In working out the catch goals, it was assumed that the annual landings of a B-15 factory trawler would average 5,000 tons. Other expected annual landings by vessel class are: B-23 freezer trawler 2,400 tons, B-20 motor trawler 1,300 tons, steam trawler 900 tons, and 24-meter cutter 450 tons.

The cooperative fisheries expect to receive ten 17-meter (55.8-foot) and two 24-meter cutters in 1965.

Processing: Polish fish-processing facilities are also being called upon to expand output, particularly of fish meal. A total of 11,400 tons of fish meal is scheduled to be produced at sea and shore plants in 1965, compared with a target of 7,660 tons in 1964. Other production goals in 1965 are 2,100 tons of cod-liver oil, 23,000 tons of canned fish, 20,500 tons of smoked fish, 6,800 tons of pickled fish, and 2,900 tons of semicooked fish dishes.

Preparing herring for hot-smoking in a fishery plant in Gdynia.

Poland (Contd.):

Poland is scheduled to spend 200 million zloty (about US$8.3 million) to modernize and expand fish-processing plants and harbors.

Exports: Planned exports in 1965 include 4,600 tons of canned fish, of which State-owned plants will supply about 3,800 tons and cooperatives 800 tons. Planned sales to West European markets include 400 tons of smoked fish and 1,750 tons of fresh and frozen fishery products (such as salmon, ocean perch, carp, eels, and shrimp). In addition, plans call for direct landings of about 9,000 tons of fish in West European and African ports during 1965.

Employment: The scheduled expansion in Polish fisheries should raise employment in the State-owned fisheries to 25,400 persons in 1965, an increase of about 1,200. (Polish Maritime News, January 1965 and February/March 1965.)

Note: See Commercial Fisheries Review, Nov. 1964 p. 107, and June 1964 p. 55.

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FISHERIES TRENDS, EARLY 1965:

Winter Fishing Activities: In the first part of February 1965, frequent and strong storms hindered fishing in the Baltic, but good catches were achieved by factory trawlers operating in the northwest Atlantic. Some of the daily Atlantic catches averaged about 50 metric tons of cod and ocean perch per unit.

During the winter months several Polish freezer-stern trawler and motor trawlers with freezing equipment fished off West Africa. Part of their catch was sold directly in African ports.

Polish trawlers from Szczecin took herring during the winter by means of midwater pair trawls in the North Sea and Skagerrak grounds.

Fisheries Research: The Sea Fisheries Institute of Gdynia has established a station at Kolobrzeg on the Baltic Sea. The new unit will study ways to modernize fishing gear and increase catches in the coastal region of the Baltic.

Aid to Foreign Fisheries: In early 1965, three Polish experts on inland fisheries left for Nigeria to spend several years as advisors on fish-breeding methods.

In mid-January, Polish fishermen sailed from Gdynia on board the Traugutt for India, where they will train Indian fishermen in operating trawls. A 17-meter (55.8 feet) fishing cutter for India was also shipped on board the vessel.

Danish Fishery Talks: In the second half of January, a delegation of Polish cooperative fisheries organizations visited Denmark and carried out talks with representatives of Danish fishery organizations on problems of interest to fishermen of both countries. It was resolved to carry out more meetings of this kind and undertake direct cooperation and exchange of information in the field of fishing and processing. (Polish Maritime News, February/March 1965.)

Note: See Commercial Fisheries Review, May 1965 p. 85.

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FISHERIES TRENDS, 1964:

Landings: Polish landings of salt water fish in 1964 amounted to about 244,400 metric tons, surpassing the overall catch goal for the year by 21,400 tons. The 1964 landings were also up considerably from the 210,000 tons landed in 1963 and 164,000 tons in 1962.

Table 1 - Polish Landings of Salt-Water Fish, 1964[1/]

Species	Total	State-Owned Fisheries	Cooperatives	Private Fishermen
	(Metric Tons)			
Salmon	355.9	2.0	265.1	88.8
Baltic eel	153.7	-	16.6	137.1
Baltic herring	18,844.2	11,673.2	5,176.4	1,994.6
North Sea herring	94,371.8	94,054.9	316.9	-
Sprat	17,693.4	12,141.7	2,262.9	3,288.8
Cod	53,563.5	38,269.5	9,896.6	5,397.4
Flatfish	6,472.0	5,155.7	752.8	563.5
Mackerel	10,653.9	10,653.7	0.2	-
Ocean perch	21,414.6	21,414.6	-	-
Other salt-water fish[2/]	18,116.3	17,823.7	104.5	188.1
Brackish-water fish	2,745.5	-	[3/]2,566.6	178.9
Total	244,384.8	211,189.0	21,358.6	11,837.2

1/Preliminary.
2/Includes catch off Africa.
3/Includes 503.8 tons of eel.

The 1964 landings included 116,300 tons from the North Sea (31,300 tons over the catch goal for the area), 47,400 tons from the Atlantic (400 tons over the goal), and 80,700 tons from the Baltic Sea (10,300 tons under the goal).

A larger catch of North Sea herring accounted for most of the 1964 increase over the previous year. Landings were also up

Poland (Contd.):

for sprat, ocean perch, and mackerel, but landings were down for Baltic Sea herring.

The heavy catch of North Sea herring taken by Polish catchers was delivered not only to Polish bases and tender vessels but also to transshipment bases at the British port of North Shields, the Norwegian port of Haugesund, and the Belgian port of Ostende.

Fishing Fleet: Additions to the Polish fishing fleet in 1964 included 3 "B-15-type" factory trawlers of 2,890 gross tons, 7 "B-23-type" freezer trawlers of 1,160 gross tons, and 16 cutters. By the end of 1964, the Polish fleet included 10 factory trawlers, 10 freezer trawlers, 15 motor trawlers, 54 steam trawlers, 44 drifter-trawlers, 2 base ships, 1 tender ship, 568 cutters, and about 870 other boats and vessels.

Processed Fishery Products: With new factory trawlers and freezer trawlers entering service, Polish output of processed fishery products was up sharply in 1964. Frozen fish and fillets showed the largest increase (50,000 tons in 1964 as against only 23,400 tons in 1963).

Table 2 - Polish Production of Processed Fishery Products, 1960-1964

Products	1/ 1964	1963	1962	1960
	(1,000 Metric Tons)			
Frozen fish and fillets	50.0	23.4	21.5	22.4
Salted fish	61.5	54.6	45.6	58.7
Smoked fish	2/	18.5	17.7	16.0
Conserves 3/	23.0	20.7	18.1	15.7
Marinades	2/	6.7	7.1	6.0
Cod-liver oil	2.2	1.9	1.4	1.1
Fish meal	9.5	7.0	4.8	3.3
Fish pulp	3.5	2.8	1.3	-

1/Preliminary.
2/Not available.
3/Includes hermetically-processed canned pack and cold-pack.

Imports: The rising demand for animal feed boosted Polish fish meal imports from 6,406 tons in 1960 to over 55,000 tons in 1964. During the same period, Polish imports of salted herring and canned fishery products declined as domestic fisheries expanded. Polish canned fish imports in 1964 consisted mainly of sardines in oil, a product which is not being produced by the domestic industry.

Table 3 - Polish Imports of Fishery Products, 1960-1964

Product	1/ 1964	1963	1962	1960
	(Metric Tons)			
Mackerel, frozen	1,450	568	500	-
Herring, fresh and frozen	5,583	3,891	5,992	4,014
Herring, salted	6,490	8,517	5,132	19,681
Fish fillets	-	-	-	1,419
Conserves 2/	2,069	1,328	2,670	6,141
Caviar	10	10	10	10
Fish meal	55,700	30,000	13,000	6,406
Total	71,302	44,314	27,304	37,671

1/Preliminary.
2/Includes hermetically-processed canned pack and cold-pack.

Exports: Polish exports of fishery products increased from 6,582 tons in 1960 to 11,162 tons in 1964. Almost half of the 1964 fishery exports consisted of direct landings of fresh and frozen fish in European and African ports. Most of the direct landings were sold in Ghana and Nigeria from "B-23-type" freezer trawlers and motor trawlers operating in the eastern Atlantic.

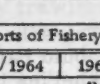
Table 4 - Polish Exports of Fishery Products, 1960-1964

Product	1/ 1964	1963	1962	1960
	(Metric Tons)			
Fresh and Frozen:				
Salmon 2/	209	272	206	216
Other salt-water 2/	5,559	4,270	405	-
Carp	478	380	379	546
Other fresh-water fish	925	892	933	852
Smoked fish	236	392	316	6
Salted fish	40	15	203	2,125
Conserves 3/	3,695	3,414	3,733	2,807
Shellfish	20	32	36	30
Total	11,162	9,667	6,211	6,582

1/Preliminary
2/Direct landings in foreign countries.
3/Includes hermetically-processed canned pack and cold pack.

Polish exports included 3,695 tons of canned fish, of which 1,900 tons were sold to countries outside the Soviet Bloc. (Polish Maritime News, February/March 1965.)

Note: See Commercial Fisheries Review, June 1964 p. 55.



South Africa Republic

ANCHOVY EXPERIMENTAL FISHING CONTINUED OFF SOUTH-WEST AFRICA:

Experimental anchovy fishing off Walvis Bay in South-West Africa was resumed in mid-January 1965. Two vessels searched the area between Cape Cross north of Walvis Bay and Sandwich Harbour to the south, but without any early success.

Each pilchard factory at Walvis Bay has been licensed to use two anchovy nets for experimental fishing. Anchovy fishing off Walvis Bay during August, September, and October last year was not encouraging. Only 718 short tons of anchovy were caught off South-west Africa in 1964. On the other hand over

South Africa Republic (Contd.):

100,000 tons of anchovy were caught off the Cape West Coast of the South Africa Republic in 1964. (South African Shipping News and Fishing Industry Review, February 1965.)

* * * * *

PELAGIC SHOAL CATCH, INDUSTRIAL PRODUCTION, AND CANNED FISH PACK, 1959-1964:

With a total catch in 1964 of 1,195,353 short tons of pilchard, maasbanker, mackerel, and anchovy, the South African pelagic shoal fish factories of the Cape, Walvis Bay, and Lüderitz had a record production during the year of 283,989 short tons of fish meal and 70,016 long tons of fish-body oil. In addition, the canned fish pack, which in 1963 had fallen to 2,500,000 cases, rose to 4,117,865 cases in 1964.

South African Pelagic Shoal Catch and Production of Fish Meal, Fish-Body Oil, and Canned Fish, 1959-1964

Year	Catch	Production		
		Fish Meal	Fish-Body Oil	Canned Fish
	. . . (Short Tons)		Long Tons	Cases
1964	1,195,353	283,989	70,016	4,117,865
1963	1,085,806	262,573	46,678	2,506,326
1962	986,301	223,094	57,063	4,841,117
1961	922,362	199,123	57,632	5,218,219
1960	765,318	155,012	40,995	5,234,901
1959	641,787	132,733	31,116	2,871,454

During the 1964 season in the Territory of South-West Africa, the 7 factories at Walvis Bay and 1 factory at Lüderitz received 723,057 short tons of pilchards and 718 tons of anchovy. That record catch was reduced to 175,186 short tons of fish meal and 48,159 long tons of fish-body oil. The Walvis Bay factories also packed 3,574,347 cases of canned fish.

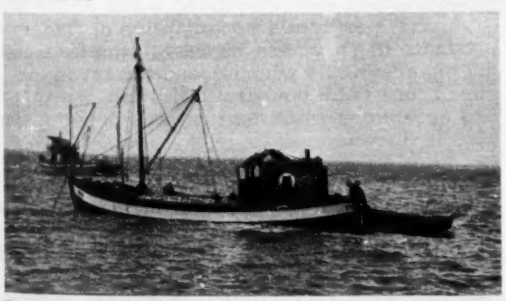


Fig. 1 - A 51-foot Walvis Bay vessel with a full load of pilchards.

On the Cape West Coast of South Africa in 1964, 15 factories received 282,301 short tons of pilchards, 27,279 tons of maasbanker, 57,368 tons of mackerel, and 104,630 tons of anchovy (a total of 471,578 tons) and reduced that catch to 108,803 short tons of fish meal and 21,857 long tons of fish-body oil. The canned fish pack was 543,518 cases.

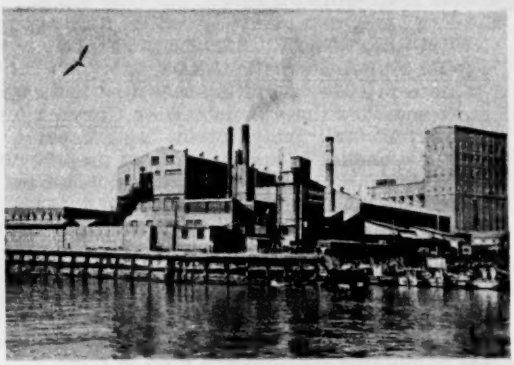


Fig. 2 - A modern fish meal plant at Alfred Basin, Cape Town.

The South African pelagic shoal catch has increased steadily since 1959 when 641,787 short tons were landed. During 1959-1964, fish meal output also increased sharply, but production of fish-body oil and canned fish showed considerable fluctuation. (The South African Shipping News and Fishing Industry Review, February 1965.)

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PELAGIC SHOAL CATCH, JANUARY-NOVEMBER 1964:

By the end of November 1964, Cape shoal fishing vessels of the South Africa Republic had brought the 1964 season catch of pilchard, anchovy, maasbanker, and mackerel up to 462,930 short tons.

In South-West Africa all 8 factories at Walvis Bay and Lüderitz had completed their quotas for the year after processing a total of 723,057 tons of pelagic fish (mostly pilchard).

The combined pelagic shoal fish catch in the South Africa Republic and Territory of South-West Africa in January-November 1964 totaled 1,185,987 tons. That was made up of 1,006,610 tons of pilchard (284,271 tons from Cape waters), 98,013 tons of anchovy (Cape 97,295 tons), 25,438 tons of maasbanker, and 55,926 tons of mackerel.

South Africa Republic (Contd.):

The limited shoal fishing allowed off the Cape in November 1964 yielded a catch of 16,785 tons of anchovy and 4,054 tons of maasbanker. (The South African Shipping News and Fishing Industry Review, January 1965.)

Note: See Commercial Fisheries Review, May 1965 p. 87.

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NEW STERN TRAWLERS DELIVERED FROM FOREIGN SHIPYARDS:

Late in 1964, a British shipyard in Lowestoft launched the stern-trawler Corvina for a South African-Spanish trawling company. The new vessel is a sistership of the 300-ton stern-trawler Sea Horse, which arrived in Hout Bay, South Africa, in June 1964. The Corvina was scheduled to sail for Hout Bay in March 1965.

Another South African trawling company took delivery of the new 576-ton stern-trawler Pionier II in December 1964 after the vessel completed its delivery voyage from a shipyard in the Netherlands to Cape Town. According to previous reports, the Pionier II will help supply a filleting and freezing plant near Cape Town.

A third South African company took delivery of the stern-trawler Hawthorn in January 1965 after the vessel completed its delivery trip from a shipyard in Aberdeen, Scotland, to Cape Town.

The new stern trawlers will help diversify South African fisheries. (The South African Shipping News and Fishing Industry Review, January 1965.)

Note: See Commercial Fisheries Review, Jan. 1965 p. 87 and July 1964 p. 73.

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SHARK FISHING TESTS OFF NATAL:

Three weeks of experimental long-line fishing for sharks off the South African east coast in the Natal area were scheduled in early 1965 by the Government research vessel Sardinops (operated by the Division of Sea Fisheries). An investigation of shoal fish, tuna, and plankton was to be included in the shark study.

If experimental long-lining for sharks yields good results, it may be possible to start a commercial shark fishery off the Natal coast. That would not only add another fish species to the catch of local vessels, but might also help reduce the shark danger along Natal beaches. (The South African Shipping News and Fishing Industry Review, January 1965.)

Taiwan

TUNA FLEET:

Taiwan's tuna long-line fleet at the end of 1964 numbered 678 vessels (19,133 gross tons), according to a survey conducted by the Japan Frozen Tuna Producers Association. Of that number, 38 vessels were over 100 gross tons in size. Tuna production by that long-line fleet in 1964 included 7,000 metric tons landed at Kaohsiung, southern Formosa, and approximately 3,500 tons delivered to American Samoa. (Suisan Tsushin, March 30, 1965.)

* * * * *

FISH CONSUMPTION TRENDS:

Annual per capita consumption of fishery products in Taiwan averages 27.3 kilos (60.2 pounds), according to a 1963 survey of 1,000 representative families conducted by the Taiwan Fisheries Bureau. (Editor's Note: Consumption data reported by the Taiwan Fisheries Bureau may be on a round weight basis. The Food and Agriculture Organization has reported annual per capita consumption of fishery products in Taiwan in 1961 as 28.7 pounds on an edible weight basis.)

According to the Taiwan Fisheries Bureau, consumption of fish in Taiwan is much greater than the annual per capita consumption of meat (about 25.7 pounds), poultry (about 6.0 pounds), and eggs (about 10.3 pounds).

Annual per capita consumption of fishery products in Taiwan is highest in the fish-producing area (82.0 pounds) and lowest in the rural area (52.9 pounds). Milkfish, sea-bream and croaker seem to be the most popular species in Taiwan.

All of the 1,000 families interviewed were consumers of fresh fish, and 707 families also ate dry-salted fish, such as sardines, hairtail, bonito, mackerel, and cuttlefish. But only 555 of the 1,000 families interviewed bought canned fish, such as sardines, mackerel, bonito, and eel. The reasons given for not buying canned fish by the other families were: (1) price

Taiwan (Contd.):

Early in the morning every inch of the fish market in Kaohsiung is filled with baskets of fish. They are quickly weighed and removed by truck for retail sale or refrigerated.

too high, (2) not palatable, and (3) not accustomed to it.

As to method of preparation, most families preferred frying. People in fish-producing areas had a relatively high preference for raw fish. Urban people liked fish fried, in soy sauce, or steamed. Rural people liked to dry or steam their fish. (Brief Report on Survey of Fish Consumption, Indo-Pacific Fisheries Council, Food and Agriculture Organization.)

U.S.S.R.

SOVIET TRAWLING ACTIVITIES OFF SOUTH AFRICA, DECEMBER 1964:

The Soviet trawling fleet operating off the South African coast was reported to have shifted its operations northward in December 1964. At that time a fleet of 15 Soviet trawlers was said to be fishing off the mouth of the Kunene River, which is the border between South-West Africa and Angola. Soviet trawlers were also reported off the mouth of the Congo River.

In the past the Soviet trawling fleet seeking groundfish off South Africa has usually moved somewhat to the north in late November and then returned to waters off the South Africa Republic in February or March.

The Soviet tanker Ventspils called at Walvis Bay in late November 1964 after refueling the Soviet fishing fleet off South Africa. The vessel, which is reported to have a capacity of 3,000 tons of oil, took on stores and fresh water at Walvis Bay before returning to its home port on the Baltic Sea. (The South African Shipping News and Fishing Industry Review, January 1965.)

Note: See Commercial Fisheries Review, March 1965 p. 93.

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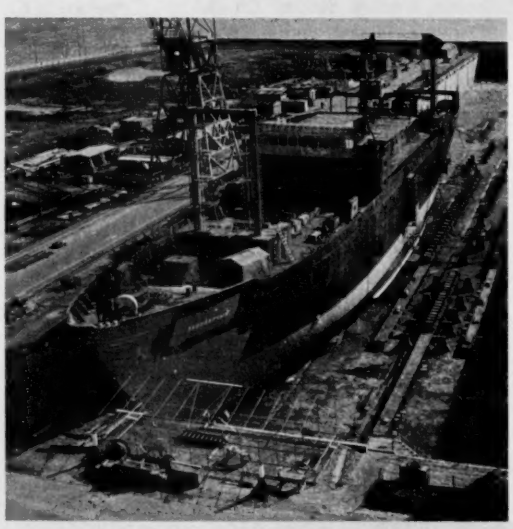
FREEZER-TRAWLER "ZAPOLJARNYJ" BUILT FOR SOVIETS BY DANISH SHIPYARD:

The 2,550-ton freezer-trawler M/S Zapoljarnyj was launched March 30, 1965, by a shipyard in Copenhagen, Denmark, for V/O Sudoimport, Moscow. The vessel is another in the series of 15 freezer-trawlers for the



The M/S Zapoljarnyj in construction dock at Copenhagen.

U.S.S.R. (Contd.):

U.S.S.R. being built by the Danish shipyard to the following specifications: length between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,550 to 2,600 metric tons. The first vessel in the series was the M/S Skryplev launched May 10, 1962.

The M/S Zapoljarnyj is powered by a 6-cylinder diesel engine developing 3,530 horsepower at 200 r.p.m. Speed on loaded trials was 14 knots. The vessel is designed to serve mainly as a refrigerator vessel, but it can also operate as a stern trawler. It is equipped with a large stern chute for trawling and also for hauling aboard catches of other vessels.

The propulsion machinery as well as the refrigerating plant are located amidships, with large refrigerated cargo holds fore and aft. The entire superstructure is arranged amidships.

The rigging consists of two pairs of self-supporting derrick posts. The foremost pair is provided with a top mast as well as a self-supporting combined signal and radar mast. The derricks (four 3-ton and two 7-ton) are served by four 3-ton and two 5-ton winches. The deck machinery also includes one anchor winch, two 3-ton warping winches, and one 15-ton trawl winch. All winches are electric-hydraulic. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, April 9, 1965.)

Note: See Commercial Fisheries Review, April 1965 p. 87, and Mar. 1965 p. 93.

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ANOTHER TROPIK-CLASS STERN TRAWLER DELIVERED BY EAST GERMANY:

The 43rd stern trawler of the Tropik-class was delivered to the Soviet Union in early December 1964 by the People's Shipyards at Stralsund, East Germany. The Tropiks are 2,600-gross-ton vessels and carry a crew of about 75. Although they are basically trawlers, that class vessel is also equipped for long-lining, electric-light fishing, and purse seining. The vessel catch is mostly frozen (daily capacity 30 metric tons), but some is also processed into fish meal and fish oil.

As of April 1965, most of the Soviet Tropiks operated off northwest and southwest Africa and in the Indian Ocean. Some have been observed on Georges Bank in the North Atlantic, and also off the United States Middle and South Atlantic coasts.

Under a contract negotiated with East Germany in 1961, an additional 23 vessels of that type are to be delivered to the Soviet Union by the end of 1965.

Note: See Commercial Fisheries Review, December 1964 p. 94.

* * * * *

NEW BALTIC SEA BASE FOR FREEZERSHIP FLEETS:

The Soviet Baltic port of Klaipeda is the site of a new centralized base for Soviet marine fishing fleets. The "Klaipeda refrigerator-fleet base" will supply gear, packaging material, food stores, and fuel oil to Soviet transport and fishing vessels.

Concentration of management is said to be the object of the new base which was established by a decree of the Soviet Board of the Main Administration of Fisheries of the Western Basin in the Lithuanian Production Department of Fisheries. (Rybnoe Khozyaistvo, 41 (1), 1965.)

United Kingdom

FISHERY LOAN INTEREST RATES REVISED:

The British White Fish Authority announced that their rates of interest on loans made as from February 6, 1965, would be as follows:

For processing plants: on loans for not more than 20 years, 7 3/4 percent (increase 7/8 percent).

For fishing vessels of not more than 140 feet, new engines, nets and gear: on loans for not more than 5 years, 7 3/8 percent (increase 1 1/4 percent); on loans for more than 5 years but not more than 10 years, 7 1/8 percent (increase 1 percent); on loans for more than 10 years but not more than 15 years, 7 percent (increase 3/4 percent); on loans for more than 15 years but not more than 20 years, 7 percent (increase 5/8 percent).

The rates on advances made before February 6, 1965 are unchanged. (Fish Trades Gazette, London, February 20, 1965.)

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United Kingdom (Contd.):

TRAWLER "STELLA LEONIS" REPEATS AS WINNER OF SILVER COD TROPHY IN 1964:

The 190-foot trawler Stella Leonis won the British Silver Cod Trophy in 1964 for the second successive year, after a very close race with the Somerset Maugham. The trophy is presented annually to the British distant-water vessel with the largest catch for the year.

Silver Cod Trophy winner in 1964. The Stella Leonis is fitted for starboard fishing only. Fish storage hold has a capacity of 18,170 cubic feet.

In 1964, the Stella Leonis after 340 days at sea landed 35,505 kits (4,970,700 pounds) valued at £144,153 (US$403,628). The runner-up Somerset Maugham after 337 days at sea landed 35,418 kits (4,958,520 pounds) valued at £150,976 ($422,733).

The winning margin of the Stella Leonis was only 12,180 pounds--the smallest on record--and the value of her catch was actually surpassed by the Somerset Maugham. The outcome of the race was in doubt right up to the final weighout of the season.

The Stella Leonis was also the winner of the Silver Cod Trophy in 1963 with landings of 39,556 kits (5,537,840 pounds) valued at £161,500 ($452,200). The record for the competition which started 11 years ago is held by the Kirkella, which landed 46,589 kits or 6,522,460 pounds.

Note: See Commercial Fisheries Review, May 1964 p. 77 and March 1964 p. 75.

U. S. SCIENTIST REARS BROWN SHRIMP FROM EGGS

The first successful rearing of brown shrimp from eggs has been accomplished by a biologist of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., after almost five years of concentrated effort. He is one of four scientists in the world known to have been successful in rearing shrimp from eggs. Only 2 of those 4 scientists have successfully duplicated their experiments--the U. S. Bureau of Commercial Fisheries scientist and a scientist in Japan. The Japanese scientist, who has worked in the field for 22 years, runs a commercial shrimp farm which supplies Japanese fish markets with a product similar to that of the commercial white shrimp of the United States. Scientists of the University of Miami (Florida) have successfully reared pink shrimp from eggs. A French woman scientist has grown a species of shrimp from eggs. The United States scientist has also successfully raised rock shrimp.

A "key" to aid researchers in identification of the larval stages of the brown shrimp in plankton samples is in process. Studies to refine techniques and develop economical methods for artificial culture of shrimp in commercial quantities will be carried out. The brown shrimp (Penaeus aztecus) is one of the three most important commercial shrimp resources of the South Atlantic and Gulf coasts of the United States.

FEDERAL ACTIONS

Department of Commerce

AREA REDEVELOPMENT ADMINISTRATION

OYSTER INDUSTRY STUDY TO BE CONTINUED IN WILLAPA BAY, WASHINGTON:

Approval of a $32,000 technical assistance project to finance a second year's work in oyster production research at Willapa Bay, Wash., was announced April 9, 1965, by the Area Redevelopment Administration (ARA).

The project, requested by the Washington State Department of Fisheries, continues a program designed to develop ways to increase the yield of marketable oysters, increase the nutrient level of oyster beds through application of chemical fertilizers, and increase the production of local oyster seed.

A review of the findings of the program after the first year shows that it holds promise of ultimately increasing employment and income in the Willapa Bay area.

The project has already helped the oyster industry in Willapa Bay to increase its supply of seed oysters.

Note: See Commercial Fisheries Review, Feb. 1964 p. 88.

Department of the Interior

FISH AND WILDLIFE SERVICE

GOVERNMENT-INDUSTRY MEETING ON PROPOSED REVISED STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP:

The U. S. Bureau of Commercial Fisheries received comments and objections to the Proposed Revised Standards for Grades of Frozen Raw Breaded Shrimp which were published in the Federal Register, March 18, 1965. In addition to the comments, the Bureau also received a request to hold a meeting with industry to discuss the points of objection.

In response to that request, the Bureau held a meeting with industry on April 30, 1965, in Washington, D. C. For the convenience of the industry, the meeting was arranged to coincide with the North American Fisheries Conference.

Note: See Commercial Fisheries Review, Feb. 1965 p. 85, May 1965 pp. 91, 95.

* * * * *

NOTICE OF PROPOSED AMENDED ELIGIBILITY REQUIREMENTS UNDER THE FISHING FLEET IMPROVEMENT ACT OF 1964:

In order to prevent payment of disproportionate amounts to any individual applicant under the Fishing Vessel Construction Differential Subsidy Program and disproportionate subsidy payments in any one region, notice of a proposed amendment to Title 50, Code of Federal Regulations, Part 256, was published in the Federal Register, April 14, 1965. The proposed amendment to provide additional eligibility requirements as published follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 256]

FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY

Proposed Revision of Procedures

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Act of June 12, 1960 (P.L. 86-516; 46 U.S.C. 1401-1413), as amended, it is proposed to amend 50 CFR Part 256 as set forth below. The purpose of the amendment is to prevent payment of a disproportionate amount of the subsidy to any individual applicant who applies for subsidies for the construction of more than one vessel in a fiscal year or to applicants from one Region during a fiscal year if such payment would prevent another applicant from obtaining a sub-

sidy payment because of a lack of funds available to the Secretary of the Interior for such payments.

This proposed amendment relates to matters which are exempt from the rule making requirements of the Administrative Procedure Act (5 U.S.C. 1003); however, it is the policy of the Department of the Interior that, whenever practicable, the rule making requirements be observed voluntarily. Accordingly, interested persons may submit, in triplicate, written comments, suggestions, or objections with respect to the proposed amendments to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240, within 30 days of the date of publication of this notice in the FEDERAL REGISTER.

Section 256.2 is amended by adding paragraphs (h) and (i) to read:

§ 256.2 Definitions.

* * * * *

(h) Affiliate. Any person that directly, or indirectly through one or more intermediates, controls, or is controlled by, or is under common control with the applicant. The term "control", including the terms "controlled by" and "under common control with", means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of the applicant, whether through ownership, by contract, or otherwise.

(i) Region. One of the Administrative Regions or Areas of the Bureau of Commercial Fisheries set forth in the Department of the Interior Departmental Manual, Part 140.3.4.

Section 256.3 is amended by adding paragraph (e) to read:

§ 256.3 Eligibility requirements.

* * * * *

(e) In addition to those conditions which the Secretary may attach from time to time under sec. 2(8) of the Act or otherwise, the following conditions shall apply to all applications:

(1) Unless otherwise determined by the Secretary no application for subsidy will be considered in any fiscal year from any applicant or its affiliate who has been awarded a subsidy in that year or has a subsidy application pending.

(2) Unless otherwise determined by the Secretary no application for subsidy will be considered in any fiscal year where the total subsidy, in any one Region or Area, may on the basis of pending and decided applications, exceed thirty percent (30 percent) of the total funds available for obligation in such fiscal year.

STEWART L. UDALL,
Secretary of the Interior.

APRIL 7, 1965.

* * * * *

PROPOSED AMENDED REGULATIONS UNDER THE COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT:

Notice of a proposal to adopt amendments to Title 50, Code of Federal Regulations, Part 253--Commercial Fisheries Research and Development--was published in the Federal Register, April 15, 1965. The proposed amendments would apply only to Sections 253.2 (a) and 253.3 (f) of the regulations.

The regulations in 50 CFR Part 253 brought into effect the Commercial Fisheries Research and Development Act of 1964 (P. L. 88-309). That Act provided, among other things, for the payment under Section 4(a) of $5 million annually to States for commercial fishery research and development over a 5-year period. Congress adjourned in 1964 before it was able to appropriate funds to implement that portion of the Act.

States are required to provide matching funds equal to at least 25 percent of the cost of a project financed under Section 4(a) of P. L. 88-309. Generally the matching funds provided by States must be additional funds allocated for the particular project and not funds diverted from some other commercial fishery project. But a limited exception to that requirement was provided in Section 253.2 (a) of the regulations, for the benefit of those States in which the legislature did not meet after the Act was approved. In such case, the taking of State matching funds from appropriations for other fishery projects could be considered in fiscal years 1965 and 1966. The purpose of the proposed amendment to Section 253.2 (a) is to extend that exception for a limited time after Federal funds are appropriated to implement the Act.

The purpose of the proposed amendment to Section 253.3 (f) of the regulations is to provide an exception to State contracting procedures in respect to contracts for research and development and professional services.

The proposed amendments relate to matters which are exempt from the rule making requirements of the Administrative Procedures Act. However, interested persons were given the opportunity to submit written comments, suggestions, or objections with respect to the proposed amendments to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D. C., before May 15, 1965.

Note: See Commercial Fisheries Review, Dec. 1964 p. 118.

United States District Court

CERTAIN GULF SHRIMP FISHERMEN HELD TO BE INDEPENDENT CONTRACTORS FOR TAX PURPOSES:

On February 24, 1965, in the tax refund case, Sea Garden Corporation and Deep Sea Trawlers, Inc. v. United States, Judge McRae in the United States District Court for the Middle District of Florida ruled that captains and crewmen working on a share basis on

plaintiffs' shrimp trawlers were not employees, but independent contractors for Federal employment tax purposes.

In his opinion, Judge McRae said, "There was no evidence of any effort on the part of plaintiffs to control the captains and crewmen to such an extent that their status would be one of 'employee' (master and servant) under common law rules."

The plaintiffs owned a number of shrimp trawlers which operated in the Gulf of Mexico off the coast of Texas and Mexico. Plaintiffs selected experienced fishermen to serve as captains of their shrimp trawlers.

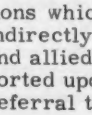
The Court found, among other things, that: "After an individual was selected as captain, the arrangement between the plaintiffs and the captain was concluded and the boat was turned over to him by plaintiffs . . . . Each captain determined the qualifications of and selected his crewmen . . . . Each captain had charge of his crew and determined (i) when to depart on a fishing trip, (ii) when to return, (iii) where to fish (that is, the fishing ground to work), (iv) when to fish, (v) how to fish (that is the actual mechanical process of operating the fishing nets and gear), and (vi) all other matters concerning the operation, maintenance, and fishing of the boat from the time of departure from plaintiffs' dock until the return of the boat from a particular trip. The foregoing were the prerogatives of the captains. The crewmen looked to the captains for their orders."

Some of the actual methods of operation mentioned by Judge McRae in his opinion were: "The captain decided how much fuel and ice to take aboard . . . . The payment to the crew for each trip depended entirely upon the proceeds of the catch. The length of any trip depended upon many factors, such as the capacity of the boat, the fuel and ice supply, the weather, and run of the shrimp . . . . When the fishing was off Campeche, Mexico, a trip may have lasted as long as 60 days, in the captain's discretion, before returning to port . . . . There was no guarantee of any kind of compensation to the captain, regardless of the time or effort expended for attempting to catch shrimp . . . . There was no express agreement specifying the extent to which plaintiffs had control over the fishing activities of the captains . . . . The plaintiffs' boats were not equipped with ship-to-shore telephones. They were equipped with radios which permitted contact with the boats only through the marine operator. The communication between plaintiffs and the boats during fishing was infrequent, usually only in cases of emergency . . . . The captains were not required to, nor did they keep any kind of ship's log . . . . The plaintiffs had no agreement with any of the captains which entitled them to a preferred call on the captains' time and services beyond the immediate trip."

As regards evidence of control by plaintiffs of captains and crews, Judge McRae found, in part, that: "Plaintiffs had certain general policies which were known to the captains and crews and which were part of the arrangement between plaintiffs and each captain; for example intoxicating liquors were not to be taken aboard the boat . . . . The boats were to be fished in the Gulf of Mexico and the catches were to be brought back to Brownsville, Tex., if possible and sold at the highest market price obtainable. Plaintiffs would terminate relations with a captain whose actions would tend to injure personnel and property." But Judge McRae held that "The degree of control exercised by the plaintiffs in the marketing of the product which was jointly owned with the fishermen was not such as to create the relationship of employer-employee (master and servant) under common law rules.

Judge McRae ruled that the essential facts in the case were not different from those considered by the United States District Court for the Southern District of Texas in the case of Crawford Packing Co. v. United States, findings and conclusions reported 228 F. Supp. 549 (1962) and affirmed 330 F. 2d 1964 (CA-5, 1964). The District Court in that case found that the shrimp fishermen were not employees under the Social Security Act.

Note: See Commercial Fisheries Review, July 1964 p. 88, Jan. 1964 p. 79, July 1963 p. 107, Aug. 1962 p. 78, and May 1962 p. 78.



Eighty-Ninth Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, per-

tinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ALASKA FUR SEAL: Rep. Sullivan in Congressional Record, Apr. 13, 1965 (pp. 7703-7704) commented on the Interior Department award of Government contract for processing Alaska fur seal skins.

BIOLOGICAL RESEARCH VESSEL DEDICATION: Rep. Henderson (Congressional Record, May 4, 1965, pp. 9110-9111) speaking from the floor of the House, stated that he attended the dedication ceremonies of the biological research vessel Eastward on May 1, 1965. This vessel has been provided by the National Science Foundation to Duke University and will be operated from the University's Marine Biological Laboratory located on Pivers Island in the Beaufort-Morehead City Harbor. He inserted the speech made at the ceremonies by John M. Drewry, Chief Counsel of the House Committee on Merchant Marine and Fisheries.

CALIFORNIA: Bodega Bay, California: H. Doc. 106, Letter from the Secretary of the Army, transmitting a letter from the Chief of Engineers, Department of the Army, Dated November 6, 1964, Submitting a Report, Together with Accompanying Papers and Illustrations, on a Review of the Reports on Bodega Bay, California, requested by a Resolution of the Committee on Public Works, House of Representatives, Adopted June 3, 1959, referred to Committee on Public Works, House of Representatives, 89th Congress, 1st session, Mar. 10, 1965, 109 pp., illus., printed. Contains favorable report from the Army Chief of Engineers on the construction of a mole and channel in Bodega Bay, Calif. Report of District Engineer discusses authority, scope of survey, Tributary area, bridges, prior reports, existing Corps of Engineers' project, local cooperation on existing and prior projects, other improvements, terminal and transfer facilities, vessel traffic, plan of improvement, shoreline changes, estimate of benefits, comparison of benefits and costs, proposed local cooperation, apportionment of costs; also contains comments from various Federal agencies. One section of the report deals with increased fish catch, increased party boat sportsfishing, and commercial fishing.

COMMERCIAL FISHERIES AND SPORT FISHERIES SEPARATION: S. 1778 (Magnuson) introduced in Senate Apr. 13, 1965, to establish the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife as separate services in the Department of the Interior and to abolish the U. S. Fish and Wildlife Service; to Committee on Commerce. Sen. Magnuson pointed out the need (Congressional Record, Apr. 13, 1965, pp. 7549-7550) to create within the Department of the Interior an Assistant Secretary for Commercial Fisheries and an Assistant Secretary for Sport Fisheries and Wildlife since the two interests (one in the development of commercial fisheries and the other in the furtherance of sport fisheries and wildlife) are obviously different although equally important.

COMMODITY PACKAGING AND LABELING: Introduced in House, H. R. 7600 (Kastenmeier) Apr. 26, and H. R. 7619 (Dent) Apr. 27, 1965, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to Committee in Interstate and Foreign Commerce.

Senate Committee on Commerce, Apr. 28-30, 1965, held hearings on S. 985, to prevent unfair or deceptive methods of packaging or labeling of commodities distributed in interstate commerce. Hearings continue. S. 985 (Hart and 12 others) introduced in Senate Feb. 3, 1965; to Committee on Commerce.

CONTINENTAL SHELF FISHERY RESOURCES: Senate received a joint resolution of the Legislature of the State of Washington (Senate Joint Memorial 17) urging the President of the United States to issue a proclamation "(1) Prohibiting foreign fishing in some or all of the waters of the Continental Shelf up to distances of 12 miles, or (2) protect, preserve and assist in the development of our fisheries resources by establishing a Marine Exploration and Development Commission;" to Committee on Commerce. Further urges the Congress to enact legislation designed to (1) implement the President's proclamation, and (2) protect, preserve and assist in the development of our fisheries resources by setting up the Commission mentioned.

FISH FARMING: S. 1671 (Fulbright) introduced in Senate Apr. 1, 1965, to amend the Consolidated Farmers Home Administration Act of 1961 in order to increase the amount for which loans may be made under such Act for fish farming; to Committee on Banking and Currency. Would provide loans up to $125,000 for fish farming in lieu of $60,000.

FISHING VESSEL REPLACEMENT RESERVE FUND: S. 1858 (Bartlett) introduced in Senate Apr. 30, 1965, to promote the replacement and expansion of the U. S. nonsubsidized merchant and fishing fleets; to Committee on Commerce. Sen. Bartlett Congressional Record, Apr. 30, 1965, (pp. 8714-8716) pointed out that what this bill in essence does is allow merchant vessel operators to commit themselves by contract with the Secretary of Commerce, and fishing vessel owners with the Secretary of the Interior, for the establishment of a vessel replacement reserve fund. Into this fund must be deposited the proceeds of the sale of any vessel, proceeds of any insurance and indemnities, annual depreciation charges, earnings made on deposits in the fund, and may be deposited moneys from other sources such as operating earnings. Such deposits are treated as tax deferred but only if they are used for this exclusive national interest purpose--the replacement and modernization of merchant or fishing vessels. The present fishing fleet is composed of approximately 12,000 vessels. Ninety percent of these are extremely small craft capable of fishing only inland and coastal waters; two-thirds of the present U. S. fishing fleet is over age; 50 percent was constructed 30 years ago. Also H. R. 7956 (Keith) introduced in House May 6, 1965; to Committee on Merchant Marine and Fisheries.

FOOD MARKETING NATIONAL COMMISSION: House April 5, 1965, suspended the rules and passed without amendment H. R. 5702, to extend for 1 year the date on which the National Commission on Food Marketing shall make a final report to the President and to the Congress and to provide necessary authorization of appropriations for such commission.

Senate Apr. 6, 1965, received for concurrence House-passed bill; to Committee on Agriculture and Forestry. Senate Committee on Commerce, in executive session, Apr. 27, 1965, ordered favorably reported H. R. 5702. Committee Apr. 30, 1965, reported (S. Rept. No. 174) to Senate H. R. 5702, without amendment.

S. Rept. 174, Extension of National Commission on Food Marketing (Apr. 30, 1965, report from the Committee on Commerce, U. S. Senate, 89th Congress, 1st session, to accompany H. R. 5702), 4 pp., printed. Committee reported bill favorably without amendment. Includes purpose, cost, and executive communications.

Senate May 3, 1965, passed without amendment and cleared for President H. R. 5702.

Commission on May 5, 1965, began hearings on a study of food retailing. Hearings continued May 6.

HEALTH, EDUCATION, AND WELFARE APPROPRIATIONS, FY 1966: Departments of Labor and Health, Education, and Welfare Appropriations for 1966: Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, 89th Congress, 1st Session, Part 1 (Exclusive of Public Health Service), 1,548 pp., Part 2, 824 pp., Part 3, 840 pp., Part 4, 835 pp., illus., printed. Includes statements and budget summaries from the agencies covered, as well as statements from outside agencies. Includes testimony of Congress, interested organizations and individuals on funds for botulism research under the Food and Drug Administration; water pollution control under Office of the Secretary; pesticide activities, water supply and water pollution control, shellfish sanitation program and botulism under the Public Health Service.

H. R. 7765, introduced in House May 5, 1965, making appropriations for the Departments of Labor, and Health, Education, and Welfare, and related agencies, for the fiscal year ending June 30, 1966, and for other purposes; to Committee on Appropriations.

H. Rept. 272, Departments of Labor, and Health, Education, and Welfare, and Related Agencies Appropriation Bill, 1966 (Apr. 29, 1965, report from Committee on Appropriations, 89th Congress, 1st session, to accompany H. R. 7765), 71 pp., printed.

HIGHWAYS AND FISH AND WILDLIFE PROTECTION: H. R. 7561 (Fulton of Pa.) introduced in House Apr. 22, 1965, to amend title 23 of the United States Code relating to highways in order to require the approval of the Secretary of the Interior to surveys, plans, specifications, and estimates for projects on the Federal-aid highway systems for the purpose of protecting fish and wildlife and recreation resources; to Committee on Public Works. (Similar to bills in 88th Congress; no action.)

HUDSON RIVER FISHERY RESOURCES: Rep. Ottinger (Congressional Record, May 3, 1965, pp. 8869-8871) spoke from the floor of the House in support of a bill (H. R. 3012) he introduced in Jan., to provide for the establishment of the Hudson Highlands National Scenic Riverway in the State of New York. Rep. Ottinger inserted an article by Robert Boyle, an editor of Sports Illustrated, which documents the destruction of the Hudson's unique anadromous fish by interests exploiting the river's resources.

Rep. Bingham Congressional Record, May 4, 1965 (p. 9110) was granted permission to extend his remarks and to insert in the record a letter from Dominic J. Pirone, a biologist and consultant for the League of Saltwater Sportsmen, which appeared in the Tarrytown News on Apr. 22, 1965. Letter supports H. R. 3012.

INTERIOR DEPARTMENT: Cain Nomination: Hearing before the Committee on Commerce, United States Senate, 89th Congress, 1st session, on nomination of Stanley A. Cain, of Michigan, to be Assistant Secretary of the Interior for Fish and Wildlife, Mar. 16, 1965, Serial No. 89-3, 24 pp., printed. Contents include biographical sketch, and statements and letters of various members of Congress.

INTERIOR DEPARTMENT APPROPRIATIONS REQUEST FY 1966: Department of the Interior and Related Agencies Appropriations for 1966: Hearings before Subcommittee of the Committee on Appropriations, United States Senate, 89th Congress, 1st Session, on H. R. 6767, making appropriations for the Department of the Interior and related agencies for the fiscal year ending June 30, 1965, and for other purposes. Part 1, Feb. 15-26, 1965, 1,047 pp., Part 2, Mar. 1-10, 1965, 967 pp., printed. Included are funds for the Fish and Wildlife Service and its two Bureaus: Commercial Fisheries and Sport Fisheries and Wildlife. Subcommittee Apr. 26, 1965, in executive session, approved bill for full committee consideration.

Committee on Appropriations Apr. 29, 1965, filed in Senate report (S. Rept. No. 172) on H. R. 6767.

S. Rept. 172, Interior Department and Related Agencies Appropriation Bill, 1966 (Apr. 29, 1965, report from Committee on Appropriations, 89th Congress, 1st session, to accompany H. R. 6767), 46 pp., printed. The Committee recommended increases for the Bureau, over the House allowances, as follows: (1) Under Management and Investigations of Resources ($1,050,000)--$250,000 for Pacific coast oyster mortality studies; $370,000 to initiate an ocean engineering program; and $430,000 for research to revitalize the Great Lakes fishing industry. (2) Under Construction ($175,000)--$100,000 to restore reductions made by the House in funds budgeted for the Columbia River program; and $75,000 for construction and installation of fish screens in the Salmon River drainage, Idaho. (3) Under Federal Aid for Commercial Fisheries Research and Development ($1,600,000): $1,150,000 for apportionment to States; $300,000 for resource disaster aid; and $150,000 for program administration.

Rep. Race in Congressional Record, May 3, 1965 (pp. A2092-A2093), in extension of remarks inserted an announcement by Sen. Nelson (Wis.) that the Senate Appropriations Committee has approved five key budget requests which offer new hope to the Great Lakes area--ultimate approval probably will rest with a Senate-House conference committee. Of interest to the Bureau are the following: (a) $430,000 to help Great Lakes fishermen, hurt by the sea lamprey and last year's marketing difficulties (less than the $1.43 million requested by Sen. Nelson, the Great Lakes Conference on Senators, and the Midwest Fisheries Council; however, the House had refused to appropriate anything for this purpose); (b) $5,600,000 to implement the Commercial Fisheries Research and Development Act of 1964, to finance research and disaster aid (when Act was approved last year, $5.5 million was authorized, but the 1966 budget recommended only $2 million and the House added $2 million).

INTERNATIONAL FISHERY TREATIES STUDY: Presented to House Apr. 14, 1965, a memorial of the Legislature of the State of Massachusetts relative to establishing a special commission for the purpose of conducting a study of existing international fishing treaties and recommending such treaty modifications

as it may deem necessary to the protection of the fishing industry; to Committee on Merchant Marine and Fisheries.

Senate received Apr. 21, 1965, a similar resolution from the General Court of the Commonwealth of Massachusetts; to Committee on Commerce.

MARINE BIOLOGICAL LABORATORY: S. 1735 (Magnuson) introduced in Senate Apr. 7, 1965, and H. R. 7778 (Bonner) introduced in House May 3, relating to use by the Secretary of the Interior of land at La Jolla, Calif., donated by the University of California for a marine biological research laboratory, and for other purposes; Senate bill to Committe on Commerce; House bill to Committee on Merchant Marine and Fisheries. Sen. Magnuson inserted in Congressional Record (Apr. 7, 1965, p. 7010) letter from the Under Secretary of the Interior requesting proposed legislation.

MARINE EXPLORATION AND DEVELOPMENT ACT: Senate Apr. 22, 1965, received a joint resolution of the Legislature of the State of Alaska (Senate Joint Res. 50) strongly endorsing S. 1091 and urging the Congress of the United States to take appropriate action to insure its prompt passage; to Committee on Commerce. S. 1091 would establish and announce U. S. policy to undertake and accelerate program of exploration and economic development of the physical, chemical, geological, and biological resources of the Continental Shelf.

Presented by Speaker to House Apr. 26, 1965, a memorial of the Legislature of the State of Alaska, relative to endorsing S. 1091.

MINIMUM WAGE: S. 1770 (Javits) introduced in House Apr. 13, 1965, to amend the Fair Labor Standards Act to provide for an increase in the minimum wage; to the Committee on Labor and Public Welfare. Would raise minimum to $1.50 an hour.

NAVIGATION FEES: S. 1875 (Magnuson) introduced in Senate May 3, 1965, to repeal and amend certain statutes fixing or prohibiting the collection of fees for certain services under the navigation laws; to Committee on Commerce. Sen. Magnuson (Congressional Record, May 3, 1965, pp. 8895-8897) pointed out that the proposed legislation would permit the Secretary of the Treasury, under general authority, to fix fees to be collected upon the rendering of any of these services: admeasurement of vessels; registry of vessels; issuance of enrollments, and licenses; or licenses, renewals of licenses, issuance of special certificates to vessels; authorization for changes of names of vessels; furnishing and recording abstracts of title of vessels; recording of evidence of title to, and encumbrances upon, vessels and the discharge of the latter; entry and clearance of vessels; furnishing certificates of ownership of vessels; furnishing copies of documents, records, or other papers filed in offices of collectors of customs or in the Bureau of Customs, and certifying such copies.

NORTH PACIFIC FISHERIES TREATY: Rep. Pelly (Congressional Record, May 3, 1965, p. A2091) in extension of remarks requested that the text of the resolution of the legislature of the State of Washington House of Representatives be inserted in the Record. The resolution states, in part, ". . . That we offer our support to our sister State of Alaska and to our congressional delegation, and that we express the hope that the problems that have arisen in connection with our fisheries may be successfully resolved at the forthcoming meetings of the North Pacific Salmon Fisheries Commission . . . ."

NORTH PACIFIC FISHERY PROBLEMS: Rep. Pelly (Congressional Record, May 3, 1965, pp. A2103-A2105) as a matter of background on problems of our American fishing industry, under unanimous consent, included the text of his remarks in a speech, "Fisheries Problems in General and in the North Pacific in Particular," delivered in Seattle on Apr. 21, at a meeting of Pacific Coast fishermen.

OCEANOGRAPHIC AGENCY OR COUNCIL: Sen. Magnuson Apr. 6, 1965, inserted in Congressional Record (pp. 6857-6858) the resolution (H. J. Res. 23), previously presented to the Senate Mar. 25, adopted by the legislature of the State of Alaska, urging congressional enactment of S. 944, to expand marine research and establish a National Oceanographic Council.

Senate Committee on Commerce, Apr. 12, 1965, held hearings on S. 944. Hearings recessed subject to call.

Sen. Fong (Congressional Record, May 3, 1965, p. 8915) pointed out that the Honolulu Advertiser, a daily newspaper, has established a professional chair in oceanography at the University of Hawaii and provided $25,000 a year for the services of whatever scientist the university selects to fill it. This will enable the University of Hawaii to augment its State-supported staff in oceanography. The Senator pointed out that hearings on S. 944 have been conducted by the Senate Commerce Committee; and that the views of those in industry and the scientific world have been particularly forceful in endorsing the objectives of that bill, which provides for expanded oceanic research of the scope and stature hoped for by communities like Hawaii.

Introduced in House, H. R. 7301 (Hanna) Apr. 8 and H. R. 7798 (Huot) May 3, 1965, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes; to Committee on Merchant Marine and Fisheries. Similar to S. 944. H. R. 7849 (Teague of Texas) introduced in House May 4, 1965, to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes; to Committee on Merchant Marine and Fisheries.

OCEANOGRAPHIC LEGAL PROBLEMS: Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries met May 4, 5, and 6 on H. R. 5175, providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

OCEANOGRAPHIC RESEARCH VESSEL INSPECTION: Senate Committee on Commerce, Apr. 6, 1965, in executive session, ordered favorably reported S. 627, to exempt oceanographic research vessels from the application of certain inspection laws. Committee Apr. 28, 1965, reported (S. Rept. 168) to Senate S. 627.

S. Rept. 168, Exemption of Oceanographic Research Vessels from Certain Inspection Laws (Apr. 28, 1965, report from the Committee on Commerce, U. S. Senate, 89th Congress, 1st session, to accompany S. 627), 7 pp., printed. Committee reported bill favorably without amendment and recommended passage. Presents pur-

pose, general statement and background, cost, agency comments, and changes in existing law.

Senate Apr. 29, 1965, passed without amendment S. 627.

H. R. 7320 (Keith) introduced in House Apr. 8, 1965; to Committee on Merchant Marine and Fisheries; similar to S. 627.

Senate-passed S. 627 was referred by the House May 3, 1965; to Committee on Merchant Marine and Fisheries.

Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries met May 4-6, on H. R. 3419.

OCEANOGRAPHY: Representative Lairs (Congressional Record, Apr. 6, 1965, pp. A1672-A1673) in extension of remarks discussed the new science of oceanography and inserted a speech by Congressman Bob Wilson (Calif.) outlining the opportunities ahead in oceanography.

Rep. Wilson in Congressional Record, May 5, 1965, (pp. A2176-A2178) in extension of remarks pointed out that oceanography in America is finally gaining notoriety and momentum. He stated that he was proud of the advances contributed in this area by San Diego, Calif., and inserted in the Record an article entitled "Oceanography in San Diego, Calif."

PESTICIDES AND FISH AND WILDLIFE: Committee on Commerce Apr. 28, 1965, reported (S. Rept. 169) to Senate on S. 1623.

S. Rept. 169, Protection of Fish and Wildlife from Pesticides (Apr. 28, 1965, report from the Committee on Commerce, U. S. Senate, 89th Congress, 1st session, to accompany S. 1623), 11 pp., printed. Committee reported favorably with amendment and recommended passage. Shows purpose, background, committee consideration of bill, Agency comments, and changes in existing law.

Senate Apr. 29, 1965, passed with committee amendment S. 1623, authorizing funds for a continued study of effects on insecticides and other pesticides upon fish and wildlife. As passed by the Senate, Department of Interior's annual appropriation of $2,565,000 ceiling would be raised to $3,200,000 for FY 1966 and to $5 million annually for fiscal years 1967 and 1968.

Senate-passed S. 1623 was referred by the House May 3, 1965, to its Committee on Merchant Marine and Fisheries.

PRICE-QUALITY STABILIZATION: H. R. 7841 (Gilligan) introduced in House, May 4, 1965, to amend the Federal Trade Commission Act, to promote quality and price stabilization, to define and restrain certain unfair methods of distribution and to confirm, define, and equalize the rights of producers and resellers in the distribution of goods identified by distinguishing brands, names, or trademarks, and for other purposes; to Committee on Interstate and Foreign Commerce.

SALMON IMPORT RESTRICTIONS: Apr. 6, 1965, S. 1734 (Magnuson and Bartlett) introduced in Senate and sent to Committee on Commerce; introduced in House Apr. 6 H. R. 7187 (Meeds), Apr. 7 H. R. 7269 (Pelly), Apr. 14 H. R. 7483 (Rivers of Alaska), Apr. 27 H. R. 7661 (Wyatt); referred to Committee on Ways and Means; bills would conserve and protect Pacific salmon of North American origin. Would provide that when the Secretary of the Interior finds that a country is fishing in a manner to diminish the effectiveness of U. S. conservation programs of Pacific salmon of North American origin, the President may increase the duty on any fishery product in any form from such country for such time as necessary to a rate not more than 50 percent above the July 1, 1934 rate. Sen. Magnuson (Congressional Record, Apr. 6, 1965, pp. 6860-6867) remarked that "This legislation would assist the United States in its continuing effort to conserve and protect the salmon resources of the North Pacific by permitting the use of economic sanctions when this becomes necessary to assure that state conservation programs for salmon are not being thwarted by abusive and reckless fishing practices by other nations." The Senator also discussed at some length the coming season for the salmon and halibut fisheries. He inserted a table of 1962 U. S. imports of fishery products from Japan by commodity description; includes the tariff of July 1, 1934, and shows by unit the quantity and value of Japanese fishery imports, and the 1963 tariff. He also inserted an editorial from Fishermen's News of March 1965, second issue, which discusses the problem of Japanese high-seas fishing of Bristol Bay salmon. Senator Magnuson in extension of remarks inserted in Congressional Record (Apr. 6, 1965, pp. A1662-A1663) an editorial ("Pacific Fisheries Competition") which discusses foreign fishing activities in waters adjacent to the United States. Rep. Pelly announced (Congressional Record, Apr. 7, 1965, pp. 6993-6994) that he was hopeful that an early hearing on this legislature could be arranged.

Rep. Rivers (Congressional Record, Apr. 15, 1965, pp. 7796-7797) in extension of remarks stated that within a few weeks fleets of Japanese fishing vessels are expected to begin an intensive harvest of red salmon on the high seas--salmon spawned in large numbers in Alaska's Bristol Bay region.

SUPPLEMENTAL APPROPRIATIONS, FY 1965 (2nd): Second Supplemental Appropriation Bill 1965: Hearings before the subcommittee of the Committee on Appropriations, House of Representatives, 89th Congress, 1st session, Part 1, 745 pp., and Part 2, Appalachian Regional Development, 282 pp., printed. Includes testimony, statements, and exhibits on additional funds for the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.

H. R. 7091 (Mahon) introduced in House Apr. 2, 1965, making supplemental appropriations for the fiscal year ending June 30, 1965, and for other purposes. Same date Committee on Appropriations filed a report (H. Rept. 224) on H. R. 7091. Includes additional funds for the Bureau of Commercial Fisheries ($1,125,000) and the Bureau of Sport Fisheries and Wildlife ($1,200,000) principally to repair flood damage to facilities; also funds for pay costs.

H. Rept. 224, Second Supplemental Appropriation Bill, 1965 (Apr. 2, 1965, report from the Committee on Appropriations, U. S. House of Representatives, 89th Congress, 1st session, to accompany H. R. 7091), 59 pp., printed. Discusses scope and summary of the bill.

Passed House Apr. 6, 1965.

Second Supplemental Appropriation Bill, 1965: Hearings before the Committee on Appropriations, United States Senate, 89th Congress, 1st session, on H. R. 7091,

an act making supplemental appropriations for the fiscal year ending June 30, 1965, and for other purposes, 840 pp., printed. Includes testimony, statements, communications, and reports from various Federal agencies and their officials, as well as Senators.

Subcommittee of Senate Committee on Appropriations held hearings Apr. 7-8, and concluded its hearings Apr. 14 on H. R. 7091. Senate Committee on Appropriations Apr. 23, 1965, in executive session, ordered bill favorably reported with amendments. Bill reported (S. Rept. 167) to Senate on same day.

S. Rept. 167, Second Supplemental Appropriation Bill, 1965 (Apr. 23, 1965, report from the Committee on Appropriations, United States Senate, 89th Congress, 1st session, to accompany H. R. 7091), 58 pp., printed.

Senate passed Apr. 27, 1965, with committee amendments (motion to reconsider tabled) H. R. 7091. Senate insisted on its amendments, asked for conference with House, and appointed conferees.

House Apr. 28, 1965, disagreed to Senate amendments to H. R. 7091; agreed to conference requested by the Senate, and appointed conferees. Conferees agreed to file a conference report on the differences between the Senate- and House-passed versions. Same day Committee of Conference filed report (H. Rept. 270) in House on H. R. 7091.

H. Rept. 270, Supplemental Appropriation Bill, 1965 (Apr. 28, 1965, report from the Committee of Conference, House of Representatives, 89th Congress, 1st session, to accompany H. R. 7091), 10 pp., printed. Committee made recommendations on the disagreeing amendments of the two Houses. In addition to the recommendations, includes statement of the House managers.

By a record vote, Apr. 29, 1965, the House adopted the conference report on H. R. 7091. Same day Senate adopted conference report on H. R. 7091, thus clearing the bill for the White House. Bill was signed Apr. 30, 1965, by the President, P. L. 89-16 (79 STAT 81).

WATER POLLUTION CONTROL ADMINISTRATION: Water Pollution Control Hearings on Water Quality Act of 1965: Hearings before the Committee on Public Works, House of Representatives, 89th Congress, 1st session, on H. R. 3988, S. 4, and Related Bills, Feb. 18, 19, and 23, 1965, 404 pp., printed. Contents include testimony of various Federal and state officials, members of Congress, associations, water resources commissions, and representatives of business firms. Testimony refers to the need to stop the outpouring of pollution into our streams and lakes, to save clean water from destruction, and to raise the quality of waters already polluted.

H. Rept. 215, Water Quality Act of 1965 (Mar. 31, 1965, report from the Committee on Public Works, U. S. House of Representatives, 89th Congress, 1st session, to accompany S. 4), 29 pp., printed. Committee reported bill favorably with amendments. Discusses purpose and major provisions of the bill, views of the committee, committee recommendation, additional views in support of bill, and changes in existing law.

By unanimous record vote House Apr. 28, 1965, passed and returned to the Senate S. 4, the Water Quality Act of 1965, after adopting a committee substitute amendment that provided new text. Adopted several perfecting amendments to the committee amendment.

Several Congressmen, speaking in support of S. 4, discussed the damage by water pollution to the shellfish industry and discussed the provision which will authorize the Secretary of Health, Education, and Welfare to take action when he finds that substantial economic injury results from the inability to market shellfish in interstate commerce due to health threats resulting from pollution of interstate or navigable waterways.

Rep. Hanley (Congressional Record, May 3, 1965, pp. A2114-A2117) pointed out that this legislation strengthens and reaffirms our national policy for the prevention, control, and abatement of water pollution. All of the functions of the Department of Health, Education, and Welfare in the area of water pollution control will be invested in a Federal Water Pollution Control Administration. Recently the Syracuse Herald-Journal has published a series of excellent articles on the major pollution problems in the 34th district.

WATER POLLUTION IN U. S. NAVIGABLE WATERS: H. R. 7976 (Stalbaum) introduced in House and S. 1908 (Nelson) introduced in Senate May 6, 1965, to expand and improve existing law and to provide for the establishment of regulations for the purpose of controlling pollution from vessels and certain other sources in the Great Lakes and other navigable waters of the United States; to Committee on Merchant Marine and Fisheries and to Committee on Public Works, respectively. Sen. Nelson in Congressional Record, May 6, 1965 (pp. 9477-9481), pointed out that the bill will meet a phase of the pollution problem which is often neglected--the pollution resulting from vessels and shore installations. The bill gives the Secretary of Health, Education, and Welfare the authority to establish reasonable regulations and standards for facilities to be used in the retention or treatment of sewage and refuse. Waters are being polluted by oil, sewage, and refuse of every kind discharged or dumped by vessels plying them. It is necessary that the disposal by vessels be controlled by forbidding it to the greatest practical extent, by establishing standards for treatment before disposal, and by designating points and places where disposal may take place.

WATER PROJECT RECREATION ACT: Water Project Recreation Act: Hearing before the Committee on Interior and Insular Affairs, United States Senate, 89th Congress, 1st session, on S. 1229, a bill to provide uniform policies with respect to recreation and fish and wildlife benefits and costs of federal multiple-purpose water resource projects, and to provide the Secretary of the Interior with authority for recreation development of projects under his control, Mar. 23, 1965, 69 pp., printed. Contents include statements and communications of various Federal and state officials, Senators, and associations.

Senate Apr. 7, 1965, received report (S. Rept. 149) of the Committee on Interior and Insular Affairs, with amendments, on S. 1229, proposed Federal Water Project Recreation Act.

S. Rept. 149, Federal Water Project Recreation Act (Apr. 7, 1965, report from the Committee on Interior and Insular Affairs, U. S. Senate, 89th Congress, 1st session, to accompany S. 1229), 31 pp., printed. Committee reported bill favorably with amendments. Discusses purpose, background of measure, committee amendments, section-by-section analysis, separable

costs-remaining benefits method of cost allocation, and changes in existing law; presents Departmental reports.

Senate passed Apr. 13, 1965, with committee amendments, S. 1229. Motion to reconsider passage was tabled.

Senate Apr. 14, 1965, asked for concurrence of the House on Senate-passed S. 1229; to House Committee on Interior and Insular Affairs.

Committee on Interior and Insular Affairs Apr. 27, 1965, filed in House report (H. Rept. 254) on H. R. 5269, to provide uniform policies with respect to recreation and fish and wildlife benefits and costs of Federal multiple-purpose water resource projects, and to provide the Secretary of the Interior with authority for recreation development of projects under his control; with amendment; to Committee of the Whole House on the State of the Union.

H. Rept. 254, Federal Water Project Recreation Act (Apr. 27, 1965, report from the Committee on Interior and Insular Affairs, House of Representatives, 89th Congress, 1st session, to accompany H. R. 5269), 28 pp., printed. Committee reported bill favorably with a amendment and recommended passage. Presents purpose, need, cost, committee amendment, section-by-section analysis, and changes in existing law.

WATER RESOURCES PLANNING ACT: Senate Apr. 5, 1965, received for concurrence House-passed version of S. 21, to provide for the optimum development of the Nation's natural resources through the coordinated planning of water and related land resources, through the establishment of a water resources council and river basin commission and by providing financial assistance to the States in order to increase State participation in such planning; to Committee on Interior and Insular Affairs.

Senate Apr. 9, 1965, disagreed to House amendments to S. 21, proposed Water Resources Planning Act, asked for conference with House and appointed conferees.

House Apr. 13, insisted on its amendment to S. 21, agreed to a conference requested by the Senate, and appointed conferees.

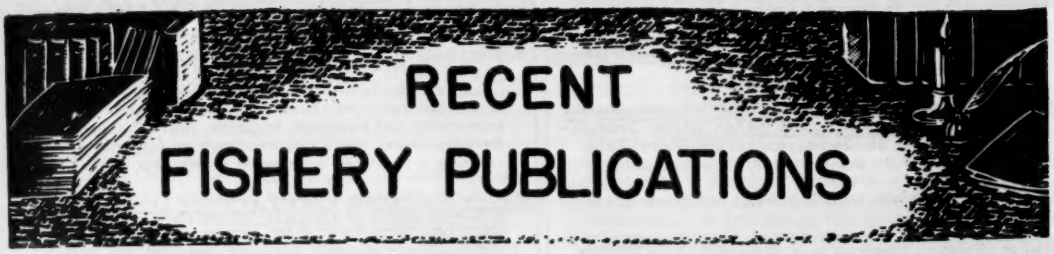
Note: REPORT ON FISHERY ACTIONS IN 88TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of all legislation of interest to commercial fisheries at the end of the 88th Congress. For copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 88th Congress, 1st Session 1963 and 2nd Session 1964," write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Room 510, Arlington, Va. 22209. Requests for this leaflet will be filled on a first-come first-served basis until the supply is exhausted.

FISH NOISES

Sounds or noises made by fish are as common as the sounds of birds, but only with the development of adequate hydrophones has it been possible to "tune in" on this aspect of fish behavior. Among the most comprehensive and thought-provoking discussions of the sounds fish make and their significance in behavior is presented by University of Maryland biologists H. E. Winn, A. Marshall, and B. Hazlett (Copeia, 1964, no. 20, pp. 413-425). Pointed out are the parallelisms between the development of alarm calls by birds and the alarm call of the squirrelfish, which include: (1) both attractive and dispersive effects on members of the same species; (2) mobbing accompanied by sound; (3) attention and alarm components; (4) differentiation of alarm call; (5) similar calls at dusk and dawn; (6) a different distress, alarm, and territorial aggressive call are developed; and (7) a potential differentiation in fishes, as in birds, of responses to a predator on the bottom and one swimming off the bottom.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20240. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number — Title

CFS-3718 - Massachusetts Landings, July 1964, 9 pp.
CFS-3719 - Maryland Landings, November 1964, 4 pp.
CFS-3728 - Fish Sticks, Fish Portions, and Breaded Shrimp, October-December 1964, 3 pp.
CFS-3732 - New Jersey Landings, December 1964, 3 pp.
CFS-3735 - California Landings, October 1964, 4 pp.
CFS-3738 - North Carolina Landings, December 1964, 4 pp.
CFS-3739 - California Landings, November 1964, 4 pp.
CFS-3740 - Frozen Fishery Products, January 1965, 8 pp.
CFS-3741 - Rhode Island Landings, October 1964, 3 pp.
CFS-3742 - Louisiana Landings, December 1964, 3 pp.
CFS-3745 - Maryland Landings, December 1964, 4 pp.
CFS-3746 - Mississippi Landings, November 1964, 3 pp.
CFS-3747 - Alabama Landings, December 1964, 3 pp.
CFS-3748 - New York Landings, December 1964, 4 pp.
CFS-3749 - Shrimp Landings, December 1964, 5 pp.
CFS-3751 - Michigan, Ohio & Wisconsin Landings, November 1964, 4 pp.
CFS-3753 - Maine Landings, December 1964, 4 pp.
CFS-3754 - North Carolina Landings, January 1965, 4 pp.
CFS-3757 - California Landings, December 1964, 4 pp.
CFS-3759 - Mississippi Landings, December 1964, 3 pp.
CFS-3762 - Texas Landings, September 1964, 2 pp.
CFS-3763 - Texas Landings, October 1964, 2 pp.
CFS-3771 - Fish Sticks, Fish Portions, and Breaded Shrimp, 1964 Annual Summary, 4 pp.
CFS-3776 - Packaged Fishery Products, 1964 Annual Summary, 5 pp.

Wholesale Dealers in Fishery Products, 1963 (Revised):

SL-24 - Minnesota (Great Lakes Area), 1963, 1 p.
SL-25 - Wisconsin (Great Lakes Area), 1963, 2 pp.
SL-27 - Indiana (Great Lakes Area), 1963, 1 p.
SL-32 - Minnesota (Mississippi River and Tributaries), 1963, 1 p.
SL-36 - Iowa (Mississippi River and Tributaries), 1963, 2 pp.
SL-37 - Kansas (Mississippi River and Tributaries), 1963, 1 p.
SL-38 - Missouri (Mississippi River and Tributaries), 1963, 2 pp.
SL-40 - Oklahoma (Mississippi River and Tributaries), 1963, 1 p.
SL-42 - Kentucky (Mississippi River and Tributaries), 1963, 1 p.

Sep. No. 732 - Soviet and Japanese Fishing Activity off Alaska in 1964.

Sep. No. 733 - The Trade Expansion Act and the Kennedy Round.

FL-57 - Care of Goldfish, 4 pp., revised Jan. 1965.

SSR-Fish. No. 491 - Monthly Sea-Surface Temperature Anomaly Graphs for Atlantic Coast Stations, by Franklin Stearns, 14 pp., illus., Dec. 1964.

SSR-Fish. No. 494 - Stream Catalog of the Wood River Lake System, Bristol Bay, Alaska, compiled by Richard A. Marriott and others, 219 pp., illus., Oct. 1964.

SSR-Fish. No. 508 - Seasonal Gonadal Cycle of the Male Soft-Shell Clam, Mya arenaria, in Maryland, by William N. Shaw, 7 pp., illus., Feb. 1965.

A Device for Stamina Measurement of Fingerling Salmonids, by Allan E. Thomas, Roger E. Burrows, and Harry H. Chenoweth, Research Report 67, 19 pp., illus., printed, 1964.

Effects of Accumulated Excretory Products on Hatchery-Reared Salmonids, by Roger E. Burrows, Research Report 66, 16 pp., illus., printed, 1964.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number — Title

MNL- 5 - Denmark's Fishing Industry, 1964, (Supplement), 23 pp.
MNL-14 - United Kingdom's Fishing Industry, 1964, 11 pp.
MNL-98 - A News Service for Europe's Fish Markets, 4 pp.
MNL-99 - The General Agreement on Fisheries and Norway's Current Subsidy System, 13 pp.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE REPORTS ARE AVAILABLE FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES, 101 SEASIDE AVE., TERMINAL ISLAND, CALIF. 90731.

Chapter XII--Tuna Industry Organizations, by Shoichi Masuda, Translation Series No. 14, 11 pp., processed, March 1965. (Translated from the Japanese, Comprehensive View of the (Japanese) Tuna Fishery, March 1963, pp. 803-813.)

Controversy Surrounding the Exporters Agreement on Canned Tuna Exports to the United States, Translation Series No. 15, 24 pp., processed, April 1965. (Translated from the Japanese, Suisan Tsushin Sha, Chiyoda Kaikan, 1-banchi, 2-chome, Kudan, Chiyoda-ku, Tokyo, Japan, Oct. 1, 1964.)

THE FOLLOWING ARE AVAILABLE FROM THE BRANCH OF REPORTS, BUREAU OF COMMERCIAL FISHERIES, U. S. DEPARTMENT OF THE INTERIOR, WASHINGTON, D. C. 20240, DISTRIBUTION LIMITED.

Distribution of Physical-Chemical Properties and Tabulations of Station Data, Washington and British Columbia Coasts, May 1963, by W. James Ingraham, Jr., Data Report 5, 3 microfiche cards, illus., March 1965.

Lake Michigan Chemical Data, 1954-55, 1960-61, by Alfred M. Beeton and James W. Moffett, Data Report 6, 3 microfiche cards, illus., March 1965.

North Pacific and Bering Sea Oceanography, 1960 and 1961, by Betty Ann Morse, Data Report 7, 8 microfiche cards, illus., March 1965.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

FL-575 - Parasites of Freshwater Fishes: IV--Miscellaneous; The Anchor Worm (Lernaea cyprinacea) and Related Species, 4 pp., Jan. 1965. (Eastern Fish Disease Laboratory, U. S. Bureau of Sport Fisheries and Wildlife, Leetown, Post Office Kearneysville, W. Va. 25430.)

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, Feb. 1965, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

Fishery and Oceanography Translations, no. 4, Jan. 1965, 51 pp., processed. (Translation Program, Branch of Reports, U. S. Bureau of Commercial Fisheries, 2725 Montlake Blvd. E., Seattle, Wash. 98102.)

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, Jan. 1965, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, solubles, and oil; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the month indicated.

Informational Guide for the Chicago Daily "Fishery Products Reports," 5 pp., 1965. (Market News Service, U. S. Fish and Wildlife Service, Rm. 704, 610 S. Canal St., Chicago, Ill. 60607.) Information to aid subscribers in interpreting the contents of the Chicago daily "Fishery Products Reports." Items covered include terms for receipts, landings, prices, cold-storage movement and holdings, imports, market trends and developments, and other explanatory information concerning the data as presented in the reports.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, Feb. 1965, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, Jan. 1965, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--Dec. 1964, 20 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York, N. Y. 10038.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

Seattle--Landings, Receipts, and Value of Fishery Products, 1964, by Charles M. Reardon, 38 pp., March 31, 1965. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Reviews Pacific Northwest fisheries trends and their effect on Seattle fishery receipts for 1964. Contains statistical tables on landings by U. S. halibut fleet; Seattle's landings and receipts of fishery products, by months; carload and truckload shipments of fishery products by months; imports of canned fishery products; receipts of Alaska canned fish and shellfish; and names, classifications, and approximate standards as used on Seattle Wholesale Market. Also presents data on receipts of fresh and frozen fish and shellfish; fresh and frozen salmon receipts and imports; ex-vessel landings and prices of fish by the otter-trawl fleet; Puget Sound canned salmon pack; and related information.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ACCLIMATIZATION:

"A discussion of the problems of acclimatization of fishes and their food," by B. G. Ioganzen, article, Breeding, Population Dynamics and Health of Fish, OTS 64-31188, printed, 1964, $1.50. (Translated from the Russian, Voprosy Ikhtiologii, vol. 4, no. 1, 1964, pp. 196-197.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

ALASKA:

A Market Research Study for a Proposed Alaska Bottomfish Industry, 110 pp., illus., processed, Feb. 1965, 55 cents. Area Redevelopment Administration, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Reports on a market research survey for a projected Alaska bottomfish industry, to determine the extent to which the products of processed Alaska bottomfish would be able to enter present markets, competitively, and provide estimates of the long-range potential of such products. A section on assessment of the Northeast Pacific bottomfish resource discusses the extent and availability of flatfish species, and the nature and distribution of present fishing effort. Another section on delineation of potential markets covers potentially important commercial markets, state and condition in which fish are marketed, present domestic and foreign suppliers of bottomfish, the potential by species and market, and projection of long-range market trends. A short chapter on possibilities of fish meal as a byproduct of the bottomfish industry is included. The final chapter, presenting consideration of the economic feasibility of an Alaska bottomfish fishery, explains wage and processing considerations; marketing, distribution, and promotion problems; pricing considerations; and management and flexibility of operation. The authors conclude that unless a proposed Alaska bottomfishery uses more efficient vessels and gear than the present West Coast industry, unless it employs more modern processing and distribution methods, unless it avoids the technical shortcomings characteristic of the bottomfish industries on both East and West Coasts, it cannot expect to approach economic viability.

ALGAE:

An Introductory Account of the Smaller Algae of British Coastal Waters. Part V--Bacillariophyceae (Diatoms), by N. Ingram Hendey, Fishery Investigations Series IV, printed, 1964, 182s. 6d. (about US$36.50 when ordered in the United States). Ministry of Agriculture, Fisheries and Food, London, England. (Available from the British Information Services, 845 Third Ave., New York, N. Y. 10022.)

ANCHOVY:

"Asombroso! Desembarcamos 8,700,000 toneladas" (Wonderful! We land 8,700,000 metric tons), article, Mundo Pesquero, vol. 2, no. 16, Dec. 1964, pp. 6-8, 42, illus., printed in Spanish, single copy 10 soles (about 40 U. S. cents). Editoriales Unidas S. A., Av. Mariscal Benavides 1207, Lima, Peru.

"La pesqueria de la Anchoveta" (The anchovy fishery), article, Informe, vol. 1, no. 1, 1965, pp. 1-15, illus., processed in Spanish. Biblioteca, Instituto del Mar del Peru, Apartado 3734, Lima, Peru.

ANTIOXIDANTS:

"Antioxidantes" (Antioxidants), article, Mundo Pesquero, vol. 2, no. 16, Dec. 1964, pp. 13-15, illus., printed in Spanish, single copy 10 soles (about 40 U. S. cents). Editoriales Unidas S. A., Av. Mariscal Benavides 1207, Lima, Peru. Discusses research being conducted in Peru on the effectiveness of three antioxidants in stabilizing fish flour, maintaining its freshness, preventing oxidation and subsequent loss of nutritive value, and eliminating spontaneous combustion.

ARGENTINA:

Following reports in Spanish available from Direccion General de Pesca y Conservacion de la Fauna, Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Buenos Aires, Argentina:

Almejas Nacaríferas de la Republica Argentina, Genero DIPLODON (Moll. Mutelidos) (Fresh-Water Mussels of the Republic of Argentina, Genus Diplodon--Mollusca Mutelidae), by Zulma J. Ageitos de Castellanos, Publicacion Miscelanea No. 421, 40 pp., illus., 1960.

Contribución al Estudio Bioeconómico de las Especies de Almejas Nacaríferas del Río Parana (Contribution to the Bioeconomic Study of the Fresh-Water Mussels of the Parana River), by Oscar A. Canzio, 34 pp., illus., 1960.

ATOMIC ENERGY COMMISSION:

Annual Report to Congress of the Atomic Energy Commission for 1964, 89th Congress, 1st Session, Senate Document No. 8, 450 pp., illus., printed, Jan. 1965. U. S. Atomic Energy Commission, Washington, D. C. 20545. A short section deals with radiation preservation of food (includes fishery products) preservation factors, acceptability factors, wholesomeness and public health safety, packaging, and irradiators. Shown is a schematic drawing of a fishery products irradiator.

AUSTRALIA:

Fishing and Whaling, Australia, 1963-64, Statistical Bulletin No. 10, 25 pp., illus., processed, March 9, 1965. Commonwealth Bureau of Census and Statistics, Canberra, Australia. This is the tenth of a series of annual statistical bulletins dealing with the fishing and whaling industry. Statistics relate to the year 1963/64 for general fisheries, the 1963 season for pearl shell and trochus shell fisheries, and the 1964 season for whaling, with comparative data for the previous four years. Exports and imports of fish products, unmanufactured shells, and marine-animal oils are shown for 1963/64 together with comparable figures for the previous two years. The bulletin is divided into four parts. Part I deals with general fisheries including those for fish, crustaceans, and molluscs (edible products). Part II includes fisheries for pearl shell and trochus shell (inedible products). Part III covers the operations of the whaling industry in Australia and Norfolk Island. Part IV shows particulars of oversea trade in the products of fishing and whaling.

BRAZIL:

Sudene, Boletim de Estudos de Pesca, vol. 3, no. 8, Aug. 1963, 21 pp., processed in Portuguese. Depart-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

amento de Industrializacao, Divisao de Pesca, Superintendencia do Desenvolvimento do Nordeste, Edificio Juscelino Kubitschek, 12º Andar, Recife, Pernambuco, Brazil. Includes, among others, articles on: "Novos horizones de Pesca no Atlântico Sul" (New horizons in the South Atlantic fishery); "Caca de baleias no Nordeste: 1963 (Jun/Jul)" (Whaling season in the Northeast, 1963--June/July), by Bento F. Grangeiro; "Métodos de beneficiamento de langostas" (Method of improving spiny lobsters), by A. R. Prater and W. A. Montgomery; and "Pescarias experimentais de lagosta no Panamá" (Experimental lobster fishery in Panama), by Harvey R. Bullis, Jr.

CALIFORNIA:

The California Marine Fish Catch for 1963, Fish Bulletin 129, 45 pp., illus., printed, 1965. Office of State Printing, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807. A summary of the 1963 landings of the California commercial fishing fleet, the imports from other states or foreign countries of fresh fish received for processing, the catches of the party boat fleet, and poundages of inshore bait handled during the year. Statistical data cover landings and shipments of leading species, by weight and value; annual landings and shipments, 1916 through 1963; number of licensed commercial fishermen; number of registered fishing vessels by length; and origin of shipments, 1963. Also included are data on origin of commercial fish landings, 1963; monthly landings and shipments, 1963, by areas and statewide; value and poundage, annual landings and shipments by areas, 1963; value of landings and shipments by ports and areas, 1963; party boat sport catch, 1954-63; and live bait catch, 1963.

Marine Baits of California, by Charles H. Turner and Jeremy C. Sexsmith, 71 pp., illus., printed, May 1964. Department of Fish and Game, 1416 Ninth St., Sacramento, Calif. 95814.

CANADA:

Costs and Earnings of Selected Fishing Enterprises, Atlantic Provinces, 1962, by John Proskie, Primary Industry Studies No. 1, vol. 12, 144 pp., illus., processed, 1964. Economics Service, Department of Fisheries of Canada, Ottawa, Canada. This is an annual progress report on a study of the economics of 137 primary fishing enterprises. They are grouped in 19 classes according to region and type and size of fishing craft and gear employed. In the first part, the findings for the 1962 season are examined and discussed. The second part includes detailed tables summarizing the fishing activities and financial results for the fishing enterprises included in the 1962 phase of the study. The study in 1962 was extended to include for the first time a sample of Nova Scotia 97-foot scallop draggers and 115-foot wooden otter trawlers.

Following are available from Queen's Printer and Controller of Stationery, Ottawa, Canada.:

Fisheries Statistics, British Columbia, 1963, Catalogue No. 24-208, 17 pp., illus., processed in French and English, March 1965, 50 Canadian cents. Presents data on the quantity and value of fishery products by species, 1951-63; quantity and value by species and fisheries districts, 1962-63; capital equipment employed in primary fisheries operations; and number of persons engaged in primary fisheries operations.

Journal of the Fisheries Research Board of Canada, vol. 22, no. 1, Jan. 1965, 254 pp., illus., printed, single copy C$2. Contains, among others, these articles: "Effects of salting and smoking on protein quality of cod," by I. C. Munro and A. B. Morrison; "Some methods for estimating ocean mortality of Pacific salmon and applications," by R. A. Fredin; "Effect of polyphosphates and other salts on drip loss and oxidative rancidity of frozen fish," by J. W. Boyd and B. A. Southcott; "Reproduction of king crabs, Paralithodes camtschatica (Tilesius)," by Guy C. Powell and Richard B. Nickerson; "Tetracycline antibiotics in shrimp preservation," by B. A. Southcott and J. W. Boyd; "Lipids and component fatty acids of the Newfoundland squid, Illex illecebrosus (Le Sueur)," by Peter M. Jangaard and R. G. Ackman; "Lampetra richardsoni, a new nonparasitic species of lamprey (Petromyzonidae) from western North America," by Vadim D. Vladykov and W. I. Follett; "Significance of early emergence, environmental rearing capacity, and behavioral ecology of juvenile coho salmon in stream channels," by J. C. Mason and D. W. Chapman; and "Northern range extensions for four species of rockfish (Sebastodes goodei, S. helvomaculatus, S. rubrivinctus, and S. zacentrus) in the North Pacific Ocean," by S. J. Westrheim.

34th Annual Report, 1963, Department of Fisheries, Catalogue No. Fs 1-1963, 137 pp., illus., printed, 1964, C$1.25. Presents the functions and activities of the Department of Fisheries for the year 1963, and the financial statement of the Department for the fiscal year 1963/64. Covers in detail the activities of the Protection Branch's patrol vessels; and those of the Conservation and Development, Inspection, Economics, Information and Consumer, and Industrial Development Services. Also covers the Fishermen's Indemnity Plan, Fisheries Prices Support Board, the Fisheries Research Board of Canada, international commissions, and special committees. Canada's Pacific and Atlantic Coast and inland fisheries are also discussed. Statistics cover the quantity and value of fish and shellfish landed, by areas and species and by areas and provinces; exports by types of products and countries of destination; number of fishermen in Canada; and value of fishing craft by areas. The appendix contains financial statements for the fiscal year 1963/64, and statements on fish-culture developments.

CANNING:

"A practical method for canning freshwater fish," by A. W. Lantz, article, Trade News, vol. 17, no. 8, Feb. 1965, pp. 3-8, illus., processed, Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

COD:

"Protein denaturation in frozen fish. IX--The Inhibitory effect of glycerol in cod muscle," by R. M. Love and M. K. Elerian, article, Journal of the Science of Food and Agriculture, vol. 16, no. 2, Feb. 1965, pp. 65-70, illus., printed, single copy £1 17s. (about US$5.20). Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

COMPOSITION:
"Lipids and protein denaturation in fish muscle," by June Olley and W. R. H. Duncan, article, Journal of the Science of Food and Agriculture, vol. 16, no. 2, Feb. 1965, pp. 99-104, printed, single copy £1 17s. (about US$5.20). Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

CRABS:
"Blackening of the outer surface of tins of canned crab," by V. S. Gordievskaya, article, Trudy Dalrybvtus, vol. 3, 1963, pp. 157-165, printed in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.

DENMARK:
"865 millioner kg. fisk til 546 millioner kroner fanget af Danske fiskere i 1964" (865 million kg. of fish worth 546 million kroner landed by Danish fishermen in 1964), article, Dansk Fiskeritidende, vol. 82, no. 8, Feb. 19, 1965, pp. 92-94, illus., printed in Danish. Dansk Fiskeritidende, Studiestraede 3, 2, Copenhagen K, Denmark.

Fisheries' Equipment and Fish Processing Machinery from Denmark, 106 pp., illus., printed (Spanish edition also available), 1965. The Federation of Danish Industries, 18 H. C. Andersens Blvd., Copenhagen, Denmark. This booklet presents descriptions and illustrations of products and processes of 43 Danish firms manufacturing fisheries equipment for export. Some of the categories are fishing vessels, engines and propellers, navigating equipment, nets and cordage, freshwater generators, fish meal and oil equipment, freeze-driers, refrigerating and freezing equipment, food processing machinery, conveyor plants, and refrigerated trucks and containers. Also includes a list of the firms represented.

DOGFISH:
"The characterization of collagen from the skin of the dogfish shark, Squalus acanthias," by Marc S. Lewis and Karl A. Piez, article, Journal of Biological Chemistry, vol. 239, Oct. 1964, pp. 3336-3340, printed. Williams and Wilkins Co., Mount Royal and Guilford Aves., Baltimore 2, Md.

EELS:
Historia de una Angula que se Convertio en Anguila (Story of a Larva Which Was Changed Into An Eel), by Jose Ma. Navaz y Sanz, 40 pp., illus., printed, 1964. Sociedad de Oceanografia de Guipúzcoa, San Sebastian, Spain.

ETHIOPIA:
Report on the Fisheries in Ethiopia, by M'nakhem Ben-Yami, 117 pp., illus., processed, 1964. Department for International Cooperation, Ministry for Foreign Affairs, State of Israel, Jerusalem, Israel. Presents the results of a survey of Ethiopia's marine and fresh-water fisheries conducted between Oct. 1960 and July 1963. Covers the resources of the Ethiopian waters of the Red Sea, the fresh fish industry, other marine products of commerce such as shells and pearls, motorization of fishing craft, the Ethiopian fisheries administration, and the Lake Tana fishery. Recommendations include establishment of a Fisheries Division, fisheries boards, and cooperatives; provision in the Five-Year Plan for improved marketing; training of fishermen and education for their children; a fishing harbor project; experimental fishing; motorization of native craft; development of the fish meal industry; increasing the demand for fresh fish; and production of fresh and canned catfish from Lake Tana.

FISH DETECTION:
The Relation of the Intensity of the Echo-Signal to the Duration of the Impulse, by E. V. Shishkova, Translations (New Series) No. 32, 4 pp., printed, 1964. (Translated from the Russian, Rybnoe Khoziaistvo, no. 1, 1962, pp. 37-40.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

FISH MEAL:
"The nitrogen metabolism of the young pig. II--Effect of heat treatment on the 'available' lysine content of fish meal and the performance of pigs," by A. A. Jones and A. Cadenhead, article, Journal of the Science of Food and Agriculture, vol. 16, no. 1, Jan. 1965, pp. 38-42, printed, single copy £1 17s. 6d. (about US$5.27). Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.

"Use of chick plasma non-protein nitrogen in evaluating fish meals," by G. R. Childs and G. F. Combs, article, Poultry Science, vol. 43, Sept. 1964, pp. 1220-1222, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

FISH OIL:
The following are from Chemical Abstracts, vol. 59, American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.:

"Edible oil from marine oil," by Seiji Okami, Eiji Negoro, and Hisatake Sato, Oct. 28, 1963, Abstract No. 10354a.

"Fish oils from fish caught in the Inland Sea of Japan, I--Oils from Harengula zunasi, saurida and halfbeak," by Seiichi Ueno and Shigeru Hamada, July 8, 1963, Abstract No. 846a.

"Reaction mechanism of antioxidant in marine products. I--Relation between the efficacy of antioxidant and the unsaturation degree of fish oil," by Kenzo Toyama, Nov. 11, 1963, Abstract No. 12090d.

FISH POISONING:
Fish Poisoning along the North Eastern Coast of Tanganyika, by C. S. Alexander, 4 pp., printed, 1964. (Reprinted from Tanganyika Notes and Records, vol. 62, March 1964.) University of Illinois, Urbana, Ill.

FISH PROTEIN CONCENTRATE:
"Fish flour (fish protein concentrate) controversy nearing solution," article, Food Processing, vol. 25, Oct. 1964, pp. 21-22, printed. Putnam Publishing Company, 111 E. Delaware Pl., Chicago 11, Ill.

"Measurement of oxygen absorption by fish flours. Stabilization by antioxidants," by J. F. Flanzy, G. Rocquelin, and Andree Pihet, article, Chemical Abstracts, vol. 59, Sept. 30, 1963, Abstract No. 8050g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

FISH SOLUBLES:

"Crystalline growth factors isolated from fish solubles," article, Feedstuffs, vol. 36, Sept. 19, 1964, p. 39, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis 5, Minn.

"Studies of the growth-promoting activity for chicks of fish solubles," by G. F. Harrison and M. E. Coates, article, British Journal of Nutrition, vol. 18, no. 3, 1964, pp. 461-466, printed. Cambridge University Press, 32 E. 57th St., New York, N. Y. 10022.

FOOD AND AGRICULTURE ORGANIZATION:

Yearbook of Fishery Statistics, 1963 (Catches and Landings), vol. 16, 367 pp., illus., processed in French, Spanish, and English, 1964, $4.50. Food and Agriculture Organization of the United Nations, Rome, Italy. (Available from Columbia University Press, International Documents Service, 2690 Broadway, New York, N. Y. 10027.) Beginning with this edition, two volumes of the Yearbook are published annually. This volume, subtitled "Catches and Landings," reports data on quantities and values of fish, shellfish, and plants landed and harvested by countries, by species, and by fishing areas. The other volume, subtitled "Fishery Commodities" covers disposition of the catches and both production and international trade data by types of fishery commodities. The tables in this volume are arranged in three sections. The first section contains statistical tables on summaries of catches by continents and by countries; by species; and by major fishing areas. The second section has data on catches by individual countries. The final section includes data on catches by species under the categories of fresh-water and diadromous fish, marine fish, shellfish, whales, seals and other marine mammals, aquatic animals and residues, and aquatic plants.

FRANCE:

"Au Pardon des Terre-Neuvas de Fecamp M. Jean Morin évoque les problèmes de la grande pêche et de l'armement hauturier" (At the pilgrimage of the Newfoundland fishermen at Fecamp, Mr. Jean Morin discusses the problems of the marine fishery and distant-water vessels), article, La Peche Maritime, vol. 44, no. 1043, Feb. 1965, pp. 77-81, 82, printed in French, single copy 14 F (about US$2.85). La Peche Maritime, 190, Blvd. Haussmann, Paris, France.

The following articles are from France Peche, no. 91, Jan. 1965, printed in French, single copy 2.50 F (about 50 U. S. cents). France Peche, Boite Postale 179, Lorient, France.:

"L'Institut Scientifique et Technique des Peche Maritimes" (The Scientific and Technical Institute of Marine Fisheries), by Jean Furnestin, pp. 4-7, illus.

"A Nice: vente sans criee" (at Nice--sale without auction), by Y. Le Berre, pp. 8-11, illus. Discusses an agreement and a contract between the fish salesmen and the fishermen-owners.

FREEZE-DRYING:

"Thermal conductivity of some freeze-dried fish," by Graham Lusk, Marcus Karel, and Samuel A. Goldblith, article, Food Technology, vol. 18, Oct. 1964, pp. 121-124, printed, single copy $1.50. The Garrard Press, 510 N. Hickory, Champaign, Ill. 61823.

FRENCH POLYNESIA:

"Fisheries development in French Polynesia," by Louis Devambez, article, South Pacific Bulletin, vol. 15, no. 1, Jan. 1965, p. 36, illus., printed, single copy 30 cents. South Pacific Commission Publications Bureau, G. P. O. Box 5254, Sydney, Australia.

FROZEN FISH:

"Preventive effect of polyphosphate on the drip formation of the thawed fish flesh," by Fuyuo Ota and Junichi Nishimoto, article, Chemical Abstracts, vol. 61, July 6, 1964, Abstract No. 1178d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

GALAPAGOS ISLANDS:

"Apuntes e informaciones sobre las pesquerias en el Archipiélago de Colon (Islas Galápagos) (Memoranda and information on the fisheries of the Columbus Archipelago--Galapagos Islands)," by Domingo Quiroga and Anibal Orbes Armas, article, Boletin Informativo, vol. 1, no. 5, 1964, pp. 1-18, illus., printed in Spanish. Biblioteca, Instituto Nacional de Pesca del Ecuador, Casilla 5918, Guayaquil, Ecuador.

GEAR:

"Theory of catching ability and the classification of commercial fishing gear," by V. N. Voinikanis-Mirskii, article, Trudy Dalrybvtus, vol. 3, 1963, pp. 29-40, printed in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.

GENERAL:

Journal du Conseil, vol. 29, no. 2, Oct. 1964, 110 pp., illus., printed, Kr. 16 (about US$2.35). Andr. Fred. Høst & Son, Bredgade, Copenhagen, Denmark. Contains, among others, articles on: "The duration of maturation stages of herring," by T. D. Iles; "Racial studies on Manx herring stocks," by D. J. Symonds; "A direct method for determining the pumping rate of siphonate bivalves," by John Coughlan and Alan D. Ansell; "Some parameters of growth of mature Venus mercenaria L.," by Alan D. Ansell; and "The spawning and fecundity of the Norway lobsters (Nephrops norvegicus L.) around the Scottish coast," by H. J. Thomas.

Wondrous World of Fishes, Editor-in-Chief Melville Bell Grosvenor, 367 pp., illus., printed, 1965, $8.75 postpaid anywhere in the world. National Geographic Society, 17th and M Sts. NW., Washington, D. C. 20036. With the greater emphasis that is being placed today on the importance of oceanography and the effect it will have on each and everyone of us in the near future, it behooves us to learn something about our watery world and the creatures that inhabit it. This book has made it easy. It reveals the fascinating and still-mysterious lives and haunts of 340 species of fish and shellfish found in and around North America and Hawaii. With more than 400 illustrations (371 in superb color), the sea and its creatures are brought right into your living room. The Society's technique of lifelike color photographs (now more realistic than ever because of the great

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progress made in underwater photography) brings the book to life. You actually travel deep into the realm where man still is an intruder. Dr. Leonard P. Schultz, curator of the Smithsonian Institution's Division of Fishes, served as scientific consultant for the book, and a large number of others contributed to the book. In the opening chapter, Dr. Schultz reveals a wealth of curious facts about fish and answers many questions. What is a fish? Do fish make noise? Do fish have external ears? Do fish sleep? Do fish drink water? Revealed are other facts: fish have rings on scales that tell age; some fish set up "cleaning stations"; the anglerfish lures its victims with "bait." In 20 chapters the book gives a close-up view of the creatures that inhabit the waters that make up the greatest part of our world. Divided into four major parts, the first one concentrates on fishing for fun. Chapters in this part take you angling in the United States, ice fishing, tarpon fishing, fishing for devilfish in the Gulf Stream. Coast and deep-sea fish are covered in the second part, and the chapters deal with fishing on the North Atlantic Grand Banks, America's first park in the sea, Florida's underwater wonderland, and the nation's major oceanariums. The third part discusses lake and stream dwellers and includes a look at West Coast streams together with the salmon and sturgeon that inhabit them; the story of the fight to save the golden trout or sunapee in a New Hampshire lake; and a look-see at aquarium fish (America's most numerous pets) which lure fortune hunters to the far corners of the world. The fourth and last major part of the book is titled "Warm-water Curiosities." The chapters in this part point up the fascination of the book: "Miracle of the Mermaid's Purse"; "Little Horses of the Sea"; and "Solving Life Secrets of the Sailfish." Each of the four parts concludes with a gallery of the species of fish pertinent to that particular part--(1) marine game fish, (2) marine nongame or commercial fish, (3) fresh-water fish, and (4) sharks and Hawaiian fish--with life histories, illustrated with photographs and paintings in brilliant, living color. One of the book's chapters points up vividly the freedom of photographers in taking pictures under water. The photographer responsible for that chapter, Jerry Greenberg, describes two months of roaming the waters of the John Pennekamp Coral Reef State Park off Florida's east coast. At a distance of only seven feet he photographed a 10-foot lemon shark eating a snapper. Chapter 20 is a "Guide to Fish Cookery" by that world-renowned gourmet James A. Beard. Besides a good index, there is also a listing of aquariums open to the public. If you are a hobbyist, a student, a biologist, an angler, a scientist, a businessman, a cook or gourmet, or just someone who has an interest in the world around you, this book will be a constant companion.

One of the 371 color photographs appearing in the book, Wondrous World of Fishes.

--Joseph Pileggi

GERMAN DEMOCRATIC REPUBLIC:

Fish Catch of the GDR to be More Than Doubled by 1970, JPRS 27932, 7 pp., processed. (Translated from the German, Seeverkehr, vol. 4, no. 10, 1964, pp. 546-550.) Office of Technical Services, U. S. Department of Commerce, Bldg. Tempo E, E. Adams Dr., 4th and 6th Sts. SW., Washington, D. C. 20443.

Gesammelte Sonderdrucke aus dem Institut fur Hydrobiologie und Fischereiwissenschaft der Universitat Hamburg 1963 (Collected Reprints from the Institute for Hydrobiology and Fisheries Science of the University of Hamburg, 1963), 127 pp., illus., printed in German or English, 1964. Institut fur Hydrobiologie und Fischereiwissenschaft, Universitat Hamburg, Olbersweg 24, 2 Hamburg-Alton 1, Federal Republic of Germany. Includes, among others, articles on: "Das neue Institut fur Hydrobiologie und Fischereiwissenschaft der Universitat Hamburg und seine geschichte" (The new Institute for Hydrobiology and Fisheries Science of the University of Hamburg and its history), by A. Buckmann; "Fisheries research and international collaboration," by C. E. Lucas; "Some comments on scientific procedure in herring investigations," by A. Buckmann; "The causes of changes in recruitment. Herring Symposium 1962, Annex II," by G. Hempel; "On the condition of herring larvae," and "The influence of egg size on herring larvae (Clupea harengus L.)," by J. H. S. Blaxter and G. Hempel; "Die auswirkung der kanalisierung unserer flusse auf die fischfauna und ihre lebensbedingunden" (The effect of the canalization of our rivers on fishes and their environment), and "Probleme der fischereilichen Nutzung kanalisierter flusse" (Use of canalized rivers for fishing), by K. Lillelund.

HAKE:

La Pesca de la Merluza en el Mar Argentino, durante el Ano 1963, Areas de Captura y Rendimientos (The Hake Fishery in the Sea Off Argentina during 1963, Areas of Capture and Yield), by Luis R. Vasquez and others, 22 pp., illus., processed in Spanish, 1964. Direccion General de Pesca y Conservacion de la Fauna, Secretaria de Estado de Agricultura y Ganaderia, Buenos Aires, Argentina.

HERRING:

On the Occurrence of Thiaminase in Baltic Herring, by Taina Kuusi, Tiedotus, Sarja IV, Kemia 52, 14 pp., printed, 1963. Valtion Teknillinen Tutkimuslaitos, Helsinki, Finland. Describes experiments to determine the quantity of thiaminase, an enzyme which destroys vitamin B_1, present in frozen Baltic herring, fresh bream, and ensilated Baltic herring. Only the gills and viscera were used and it was found that thiaminase activity occurs in Baltic herring, although it is not nearly so high as in bream. However, ensiling with acid evidently inactivates the thiaminase of the fish.

The following articles are from Trudy BaltNIRO, vol. 9, 1962, printed in Russian. Baltiiskii Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Kaliningrad, U.S.S.R.:

"Biology and Stocks of herring of the Nova Scotia shelf," by I. G. Fridlyand, A. F. Erokhin, and M. P. Yakovchuk, pp. 88-122.

"Rate of maturation in herring from Georges Bank in July-August 1961," by V. I. Sauskan, pp. 158-159.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

INDUSTRIAL PRODUCTS:

"Study of improved recovery of protein from rendering-plant raw materials and products. I--Liquid cyclone separation with carbon tetrachloride; II--Acid and enzyme hydrolysis," by L. G. Criswell and others, articles, Food Technology, vol. 18, Sept. 1964, pp. 243-251, printed, single copy $1.50. The Garrard Press, 510 N. Hickory, Champaign, Ill. 61823.

INTERNATIONAL COMMISSIONS:

(International North Pacific Fisheries Commission) Proceedings of the Eleventh Annual Meeting, 1964, 306 pp., illus., processed, March 8, 1965. International North Pacific Fisheries Commission, 6640 NW. Marine Dr., Vancouver 8, B. C., Canada. Presents the minutes of sessions and committee reports of the meeting held at Tokyo, November 16-21, 1964. Includes reports of the Committee on Biology and Research--subcommittees on sockeye salmon, pink salmon, chum salmon, coho and chinook salmon, oceanography, Bering Sea groundfish, king crab research and planning, editorial matters, and research plans. Also contains reports of the committees on finance and administration, Gulf of Alaska groundfish, and abstention.

INTERNATIONAL TRADE:

Report of the FAO/OIE/WHO Meeting on Basic Principles for the Control of International Traffic of Animals and Animal Products, Berne, Switzerland, 12-17 October 1964, Meeting Report AN 1964/9, 30 pp., processed. Animal Health Branch, Animal Production and Health Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A section on standardization and harmonization of regulations or criteria for fish and fisheries products covers a review and discussion of the problems connected with the hygenic inspection of fishery products for human or animal consumption as well as with international traffic in live fish and fish eggs for breeding, stocking, and ornamental purposes.

IRRADIATION PRESERVATION:

"The influence of gamma-radiation on semi-preserved fish products," by K. Abrahamsson, article, Iva Meddelande, vol. 138, pp. 83-84, printed. Iva, s Upplysningstjanst, Box 5073, Stockholm 5, Sweden. Second Scandinavian meeting on food preservation by ionizing radiation, Stockholm, Sept. 9-11, 1963.

JAPAN:

Journal of the Faculty of Fisheries and Animal Husbandry, Hiroshima University, vol. 5, no. 2, December 1964, 283 pp., illus., articles printed in German, Japanese, or English. The Faculty of Fisheries and Animal Husbandry, Hiroshima University, Fukuyama, Japan. Includes, among others, articles on: "On eleven new species of the Cephalopoda from Japan, including two new genera of Octopodinae," by Iwao Taki; and "Note on the fishing condition of the common octopus, Octopus vulgaris Cuvier, in the Inland Sea of Seto, Japan," by Sadaichi Nishikawa.

Memoirs of the Faculty of Fisheries, Kagoshima University, vol. 13, no. 39, Dec. 1964, 114 pp., illus., printed in Japanese with English abstracts (some articles in English). The Faculty of Fisheries, Kagoshima University, Kagoshima, Japan. Contains, among others, articles on: "Notes on the first stage Phyllosoma of Scyllarid lobster, Scyllerus bicuspidatus," by Toshio Saisho; "Topographical consideration on the shallow water fishing ground inside bay. I," by Koji Nozawa; "On the utility of some algae as agar source in the Southern Sea of Kyushu," by Fuyuo Ohta and Takesi Tanaka; "Effect of lipids on insolubilization of protein in frozen fish muscle during storage," by Fuyuo Ohta and Jun-ichi Nishimoto; "Distribution of vitamin B_{12} in the laver-farm," by Ken-ichi Kashiwada, Akio Kanazawa, and Ichiro Sasaki; "Chemical studies on volatile constitutions of algae. XX--Pharmacological action of volatile constituents and biochemical significance of the existence of acrylic acid," by Teruhisa Katayama; "Studies on the drag net. I--An increase of the current velocity inside the net." by Nobio Higo; "On the relation between the 'horizontal tuna long-line form' and the spot foretelling of the fishing condition in the Celebes Sea," by Tomio Henmi; and "Experimental studies on the eating reaction of fishes to each hook in the small long-line gear. I--On the results of experiments by 5-hook gear," by Tomokazu Morita.

Following reports in Japanese are available from the Japanese Fisheries Agency, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

General Situation of Fishing Vessel Insurance for FY 1964 (as of End of 1964), 116 pp. Consists of tables showing number of powered and nonpowered vessels by size and region covered by insurance, insured amount, insurance premium, etc., and amount subsidized by Japanese Government.

Measures Planned for Implementation for the Coastal Fisheries in 1965, 33 pp. "White Paper" for Diet.

1964 Annual Report on Fisheries Trends. Part 1--Report on Fisheries Trends; Part 2--Report on Measures Implemented for the Coastal Fisheries, 147 pp. "White Paper" on Japan's fisheries prepared for submission to the 48th (Regular) Diet Session.

Following reports in Japanese are available from the Resources Research Council, Science and Technology Agency, 2-2, Kasumigaseki, Chiyoda-ku, Tokyo, Japan:

Recommendations Concerning Modernization of Food Distribution Structure for a Systematic Improvement of Dietary Life, Recommendation No. 15, 20 pp., Jan. 26, 1965.

_____. Appended Data, 510 pp., Jan. 26, 1965.

LATIN AMERICA:

"Latin-Amerikas fiskerier utbygges i raskt tempo" (Latin America's fisheries being developed quickly), by Rolf M. Hjelseth, article, Tidsskrift for Hermetikindustri, vol. 51, no. 1, Jan. 1965, pp. 32-33, printed in Norwegian. Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

LAW OF THE SEA:

Law of the Sea--Convention on the Territorial Sea and the Contiguous Zone Between the United States of America and Other Governments--Done at Geneva April 29, 1958, Treaties and Other International Acts

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Series 5639, 70 pp., printed, 1964, 25 cents. U. S. Department of State, Washington, D. C. (Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Presents a Presidential Proclamation, including text of the Convention in English, French, Chinese, Russian, and Spanish, concerning the territorial sea and contiguous zone. Part I of the Convention covers the territorial sea--definition and extent of sovereignty; limits of the territorial sea; and right of innocent passage including rules applicable to all ships, rules applicable to merchant ships, to government ships other than warships, and to warships. Part II concerns the contiguous zone, which may not extend beyond 12 miles from the baseline from which the breadth of the territorial sea is measured. Part III covers the final articles--provisions for signature, ratification, accession, and other matters. Included are signatures to the Convention by the United States and 43 other nations.

LIVESTOCK NUTRITION:

"Nitrogen retention by cattle given all-concentrate diets containing different concentrations of fish meal," by H. B. Bowers and others, article, Proceedings of the Nutrition Society, vol. 23, no. 2, 1964, pp. 31-32, printed. Cambridge University Press, 32 E. 57th St., New York, N. Y. 10022.

LOBSTERS:

The Case for Lobster Conservation, 8 pp., illus., printed (French version also available), 1964. Queen's Printer and Controller of Stationery, Ottawa, Canada. The key to conservation and proper management is through cooperation, which can only result from a well-informed, reasonable attitude on the part of all concerned--governments, fishermen, and the fish processing industry. This booklet provides information which will enable lobstermen to understand why they should obey the present Canadian regulations. Points out these favorable results of the regulations: size limits guarantee that some lobsters remain on the grounds and increase the average size of legally marketed lobsters, which bring higher prices; small lobsters returned to the water soon grow to a more profitable size in the same locality; fishing seasons improve the quality of landed lobsters, reduce some fishing costs, permit the fishermen to fish for other species during the remainder of the year; releasing spawning females increases the hatch; and observation of regulations is the only practical means of maintaining stocks.

Wanted--Alive, Not Dead! by D. G. Wilder, General Series Circular No. 45, 7 pp., illus., printed, Feb. 1965. Biological Station, Fisheries Research Station, St. Andrews, N. B., Canada. A message to lobster fishermen on the proper care and handling of their catch. Of Canada's 45 million pounds of lobsters landed annually, probably 3 million pounds die during storage and shipment. Most of those deaths could be avoided. Suggestions include: (1) handle lobsters carefully as their underparts are easily injured; (2) band both claws quickly with rubber bands; (3) keep lobsters cool and moist; (4) don't chill or freeze them; (5) protect from rain; (6) avoid oil, creosote, bilge; (7) give stored lobsters special care, away from polluted water; (8) pack properly; and (9) cooperate and share greater profits.

NATURAL RESOURCES:

Water Resources Research, vol. 1, no. 1, First Quarter 1965, 146 pp., illus., printed, single copy $2.50; annual subscription $3 for AGU members, and $6 for nonmembers. American Geophysical Union, Suite 506, 1145 19th St. NW., Washington, D. C. 20036. In an effort to bridge the physical and social sciences and so to meet the challenge of the future, this new quarterly journal has been established as essential to a coherent development of all the water sciences. The emphasis will be upon the sciences of water--whether physical, chemical, biological, or social--rather than on water engineering or water projects. It is expected that papers will cover such diverse fields as snow, lakes, floods, hydrology, glaciology, limnology, hydraulics, water law, precipitation, stream flow, soil moisture, sedimentation, ground-water, water quality, water planning, systems analysis, water economics, river morphology, evapotranspiration, and watershed management. Some of the articles in this first issue are: "Criteria for social investment," by Kenneth J. Arrow; "Streamflow from small watersheds on the western slope of the Cascade Range of Oregon," by Jack Rothacher; and "A note on a new method of cost allocation for combined power and water desalination plants," by Joseph Barnea.

NAVIGATION:

"Scheme for the automatic directing of vessels by radio-locating deviation," by I. I. Mishenko, article, Trudy Dalrybvtus, vol. 3, 1963, pp. 75-89, printed in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.

Available free from the Coast and Geodetic Survey, U. S. Department of Commerce, Washington Science Center, Rockville, Md. 20852.:

First Supplement to United States Coast Pilot 7, Pacific Coast--California, Oregon, Washington, and Hawaii, Ninth (June 15, 1963) Edition, 13 pp., printed, Jan. 2, 1965.

Fourth Supplement to United States Coast Pilot 1, Atlantic Coast--Eastport to Cape Cod, Sixth (March 26, 1960) Edition, 20 pp., printed, Jan. 2, 1965.

Second Supplement to United States Coast Pilot 5, Atlantic Coast--Gulf of Mexico, Puerto Rico, and Virgin Islands, Fifth (June 16, 1962) Edition, 17 pp., printed, Jan. 2, 1965.

Third Supplement to United States Coast Pilot 3, Atlantic Coast--Sandy Hook to Cape Henry, Seventh (June 17, 1961) Edition, 18 pp., printed, Jan. 2, 1965.

Third Supplement to United States Coast Pilot 8, Pacific Coast, Alaska--Dixon Entrance to Cape Spencer, Eleventh (Jan. 6, 1962) Edition, 10 pp., printed, Jan. 2, 1965.

OCEANOGRAPHY:

California and the World Ocean, Governor's Conference, 118 pp., printed, 1964, $7.50. California Museum of Science and Industry, Los Angeles, Calif. (Available from the Office of State Printing, Sacramento, Calif.)

General Oceanography and Long Range Research (Annual Progress Report for July 1963-June 1964), 116

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

pp., printed, Nov. 1, 1964, $1. Scripps Institution of Oceanography, University of California, La Jolla, Calif. (For sale by the Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.)

National Oceanographic Program, Fiscal Year 1966, ICO Pamphlet No. 17, 75 pp., printed, Jan. 1965. Interagency Committee on Oceanography, Federal Council for Science and Technology, Office of Naval Research, Rm. 1818, 17th St. and Constitution Ave. NW., Washington, D. C. 20360. Outlines a coordinated plan for the accomplishment of national goals in oceanography while pursuing individual agency missions. Chapter I presents a summary of the 1966 program, agency responsibilities, and a financial statement; and program goals--strengthening basic science, improving national defense, managing resources in the world ocean, managing resources in domestic waters in order to safeguard public health and conserve resources held in common, and protecting life and property ashore and insuring safety of operations at sea. Chapter II outlines oceanographic effort--research by individual agencies, special programs, oceanographic surveys, data processing facilities and projects, international programs, and cooperative interagency programs. Chapter III, reviewing oceanographic resources, covers ships, instrumentation, facilities, and manpower and training. Appendices include budget tables and an inventory of research/survey vessels in the U. S. oceanographic fleet (including Government and privately-owned vessels).

"Oceanographic ships around the world," edited by Charles W. Covey, article, Undersea Technology, vol. 6, no. 1, Jan. 1965, pp. 35-36, 38-39, 40-41, 42, 44-49, printed, single copy $1. Compass Publications Inc., 617 Lynn Bldg., 1111 N. 19th St., Arlington, Va. 22209. A condensed tabulation of oceanographic ships showing physical characteristics, equipment, and capabilities to perform oceanographic and marine sciences work. References for operators and owners are also listed. Reported information was obtained from data submitted by ship owners and operators, and the National Oceanographic Data Center. Additional ships will be included in a reprint of this listing based on subsequent information. Copies of that reprint are available at $1.75 each.

The following articles are from Trudy BaltNIRO, vol. 9, 1962, printed in Russian. Baltiiskii Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Kaliningrad, U.S.S.R.:

"Relation between the waters and the distribution of (commercial) fishes in the Nova Scotia area," by Yu. A. Vyalov, E. A. Filippov, and E. I. Konovalev, pp. 123-130.

"The scientific fish locating expedition with RT Muksun to the southwestern coast of Africa," by Yu. A. Komarov and S. K. Kuderskii, pp. 3-18.

"Scientific fishery investigations at Malakka and Indonesia in 1960 with the trawler Arsen'ev," by A. N. Probatov, pp. 137-147.

OYSTERS:
"Elemental composition of oyster shell," by R. A. Smith and E. R. Wright, article, Chemical Abstracts, vol. 58, Jan. 28, 1963, Abstract No. 1746f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

PERU:
"Peru nets a boom in fishmeal," article, Business Week, no. 1851, February 20, 1965, pp. 64-65, 67-68, illus., printed, single copy 50 cents. McGraw-Hill, Inc., 330 W. 42nd St., New York, N. Y. 10036.

PESTICIDES:
Fish and Pesticides: A General Statement of FAO Policy, FAO Fisheries Technical Paper No. 45, 7 pp., processed, July 1964. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy.

PHYSIOLOGY:
"Marine biotelemetry," by Howard A. Baldwin, article, Bioscience, vol. 15, no. 2, Feb. 1965, pp. 95-97, illus., printed, single copy $2. American Institute of Biological Sciences, 1323 Greenwood Rd., Baltimore, Md. 21208. Several experiments involving transmission of physiological information by telemetry from unconfined marine mammals are described. Preliminary data have been obtained to date on depth of dives with seals. The electrocardiograms of several diving mammals are described as well as instruments for body temperature measurement and transmission of acoustic activity in dolphins. A technique for remote control of olfactory stimulants in freely swimming sharks is mentioned. Marine biotelemetry offers an unusual opportunity to conduct experiments in natural environmental backgrounds that should lead to a fuller understanding of the sensory and regulatory physiology of animal life. It should also give researchers the ability to monitor aquatic microenvironments of living systems without disturbing those characteristics which may be important.

PORTUGAL:
The following articles are from Jornal do Pescador, vol. 26, no. 312, Jan. 1965, printed in Portuguese, single copy 5$00 (about 20 U. S. cents). Junta Central das Casas dos Pescadores, Rua de S. Bento, 644-4º Esq., Lisbon, Portugal.:

"Frota nacional da pesca dos crustaceos" (National crustacean fishery fleet), pp. 35-36, illus.

"A lota da praia de peixe em Cascais" (The beach auction of fish at Cascais), pp. 51-52, illus.

"Matosinhos é o mais importante porto sardinheiro do mundo" (Matosinhos is the most important sardine port in the world), pp. 39-41, illus.

"O peixe grosso em Cascais é vendido no edificio da lota, em bon e agradavel estado" (The large catch at Cascais is sold in the auction house, in a good and agreeable condition), pp. 37-38, illus.

POULTRY NUTRITION:
"Feeding of fish oil and ethyl ester fractions of fish oil to broilers," by Kam C. Leong and others, article, Poultry Science, vol. 43, Sept. 1964, pp. 1235-1240, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

QUALITY:

Following articles are from Journal of the Science of Food and Agriculture, vol. 15, 1964. Society of Chemical Industry, 14 Belgrave Sq., London SW1, England.:

"Rapid estimations of hypoxanthine concentrations as indices of the freshness of chill-stored fish," by N. R. Jones and others, pp. 763-774.

"Rapid measures of nucleotide dephosphorylation in iced fish muscle. Their value as indices of freshness and of inosine 5'-monophosphate (IMP) concentration," by N. R. Jones and J. Murray, pp. 684-690.

SALMON:

Déplacements de Saumons Adultes (SALMO SALAR L.) Etiquetés en Gaspésie de 1955 à 1957 (Removal of Adult Salmon--Salmo salar L.--Tagged on the Gaspé Peninsula from 1955 to 1957), by Julien Bergeron and Leon Tremblay, Travaux sur les Pecheries du Quebec No. 3, 17 pp., illus., printed in French, 1964. Bureau des echanges, Station de Biologie Marine, Grande-Riviere, Gaspe-Sud, Quebec, Canada.

1963 Kvichak River Red Salmon Smolt Studies, by Richard A. Marriott, Informational Leaflet 48, 42 pp., illus., processed, March 1, 1965. Department of Fish and Game, Subport Bldg., Juneau, Alaska.

A Report on Fish Disease as a Possible Cause of Pre-Spawning Mortalities of Fraser River Sockeye, by James W. Wood, 27 pp., illus., processed, 1965. International Pacific Salmon Fisheries Commission, P. O. Box 1120, New Westminster, B. C. Canada.

The following articles are from Trudy Dalrybvtus, vol. 3, 1963, printed in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.:

"Spawning migration of the Pacific salmons," by I. V. Kizevetter, pp. 133-144.

"Variation in the flesh of Pacific salmon by salting and drying," by E. A. Nasedkina, pp. 145-156.

SARDINES:

"Phospholipids of the South African pilchard (Sardina ocellata Jenyns)," by M. H. Silk, article, Journal of the American Oil Chemists' Society, vol. 41, Sept. 1964, pp. 619-622, printed. American Oil Chemists' Society, 35 E. Wacker Dr., Chicago 1, Ill.

"The pilchard industry of Cornwall: a review," by M. B. Culley, article, The Fishing News, no. 2692, Jan. 8, 1965, p. 6, illus., printed, single copy 9d. (about 10 U. S. cents). Fishing News, 110 Fleet St., London EC4, England.

The following articles are from Trudy BaltNIRO, vol. 9, 1962, printed in Russian. Baltiiskii Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Kaliningrad, U.S.S.R.:

"Composition of the commercial stock of Sardinella aurita in the Takoradi and Dakar areas," by E. S. Prosvirov and I. I. Osetinskaya, pp. 81-87.

"The South African sardine (Sardinops ocellata)" (biology and fishery), by Yu. A. Komarov, pp. 19-34.

SCALLOPS:

Scallops and the Offshore Fishery of the Maritimes, by N. Bourne, Fisheries Research Board of Canada Bulletin No. 145, 60 pp., illus., printed, C$1.75. Queen's Printer, Ottawa, Canada.

SCALLOPS AND FLOUNDER:

A Marketing Study of the Scallop & Flounder Industry of New Bedford, Massachusetts, 92 pp., illus., processed, 1965, 35 cents. Area Redevelopment Administration, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) This study was undertaken by the Research Foundation of the New Bedford Institute of Technology in an attempt to assist the sea scallop and flounder fisheries in the depressed area of New Bedford. A test advertising promotion campaign was devised and conducted in representative areas of the United States to determine the effect of such promotion on the consumption of sea scallops and flounder. Results showed that a strong potential for new scallop sales exists in the West Coast area, and that the proper combination of consumer advertising, publicity, and store promotion can substantially increase flounder fillet sales in the northeastern United States. Researchers also found, however, that the New Bedford fishing industry is in serious need of an overall marketing program. Under such a program the industry should form a marketing organization to coordinate research and development with production and management, not merely advertising and promotion. As a food industry, it must develop long-range plans for improving the marketing of its products. Specific recommendations for such improvement include the adoption of a cooperative brand name and better packaging methods and design. In addition, many other considerations must be investigated, such as the establishment of an information clearinghouse, training programs, and a fishing institute. Attention should be given to a continuing study of fish population trends, and to financial, insurance, and employee benefit plans. However, the weakest aspect of the New Bedford fishing industry is the marketing problem, and the researchers urge that active measures be taken to implement the recommendations of this study.

SEALS:

Comparative Feeding Habits of the Fur Seal, Sea Lion and Harbour Seal on the British Columbia Coast, by D. J. Spaulding, Fisheries Research Board of Canada Bulletin No. 146, 52 pp., illus., printed, C$1.50. Queen's Printer, Ottawa, Canada.

SHARKS:

Sharks and Survival, edited by Perry W. Gilbert, 578 pp., printed, Jan. 1963. American Institute of Biological Sciences, 2000 P St. NW., Washington, D. C.

SMELT:

Smelt Life History and Fishery in the Miramichi River, New Brunswick, by R. A. McKenzie, Fisheries Research Board of Canada Bulletin No. 144, 77 pp., illus., printed, C$2. Queen's Printer, Ottawa, Canada.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

SMOKING:

"Physical-chemical basis for smoking (fish)," by A. M. Sushko, article, Trudy Dalrybvtus, vol. 3, 1963, pp. 127-131, printed in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti y Khozyaistva, Vladivostok, U.S.S.R.

SOUNDS IN THE SEA:

Marine Bio-Acoustics (Proceedings of a Symposium held at the Lerner Marine Laboratory, Bimini, Bahamas, April 11 to 13, 1963), edited by William N. Tavolga, 425 pp., illus., printed, 1964, 100s. ($15 in the United States). A Pergamon Press Book. The Macmillan Company, 60 Fifth Ave., New York, N. Y. 10011. The sea had long been recognized as a silent world, but this illusion was shattered when the development of underwater listening systems and sonar during World War II revealed that many marine creatures emitted sounds or noises. Since the war, underwater sound patterns and their meanings have been studied and analyzed. Many results of the studies in the United States were reported at a symposium held in the Bahamas in April 1963. It was held at the Lerner Marine Laboratory, Bimini, a field station of the American Museum of Natural History, where much pioneering work in the study of underwater sound has been carried cut with a unique shore-monitored underwater acoustic-video installation. Also, the Laboratory has a tape library of recorded material of the research in the field which is available to interested scientists. Marine bio-acoustics is a rapidly expanding field of science which embodies the interests and activities of biologists, physicists, mathematicians, acousticians, and other specialists. The symposium brought together several of those disciplines. Many of the sounds coming from the sea are now known to be of biological origin and vary from short bursts of noise to persistent sounds. A considerable amount of noise emanates from such creatures as snapping shrimp and mussels, which both produce significant crackles. Frictional or snapping noises are made by barnacles. Sea urchins make a "frying" noise. On occasions the heavy crackle made by large numbers of Crustacea often makes sonar useless for other purposes in shallow water. Many fish are vocal and the "sonar equipment of fishes is as varied as are the fishes themselves," according to the book. Sounds are variable, and the possible significances of the greatest number are related to the breeding season. In that case, a large proportion is produced either primarily, or in some instances, exclusively by the males. A chorus of sound often occurs during a particular period each day, such as the summer evening croaker chorus which in California occurs regularly each night soon after sunset for about 90 minutes. Also, it seems evident that certain marine mammals (like whales, porpoises, and dolphins) make considerable use of sound for communication, possibly navigation, and echo-location. But many of the noises heard are still a mystery. The symposium, cosponsored by the Office of Naval Research and the American Museum of Natural History, brought together some 70 specialists from various fields of science, and 22 of the papers presented are correlated in this book. The subsequent discussions are also included. The many topics were covered in five parts: an acoustic-video system for marine biological research (includes papers on requirements, description of the system, use of television); physical and acoustical aspects (includes such subjects as obtaining bio-acoustic data, processing problems, and types of noises); biological sound producers in the sea; marine fishes as acoustic detectors; and special acoustic problems in cetacean research. Included is a list of attendees and contributors, and both an author and subject index. Although not a book for the general public, it is of particular value to those directly concerned with marine sciences and to others, such as mathematicians and physicists, who are interested in some of the many aspects of marine science.

--Joseph Pileggi

SOUTH ATLANTIC:

"Development of a fishery in the South Atlantic," by S. A. Studenetskii, article, Trudy BaltNIRO, vol. 9, 1962, pp. 148-151, printed in Russian. Baltiiskii Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Kaliningrad, U.S.S.R.

SPAIN:

"Breve analisis de la exportacion Gallega de conservas de pescado en 1963" (Brief Analysis of the Galician export of canned fish in 1963), article, Industria Conservera, vol. 30, no. 305, Nov. 1964, pp. 292-294, printed. Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

"Otro ano de crecimiento de la produccion pesquera Espanola" (Another year of growth in Spanish fishery production), by Mareiro, article, Industrias Pesqueras, vol. 34, no. 905, Jan. 1, 1965, pp. 12-13, printed in Spanish, single copy 40 ptas. (about 70 U. S. cents). Industrias Pesqueras, Policarpo Sanz, 21-2°, Vigo, Spain.

Publicaciones Tecnicas Junta de Estudios de Pesca (Technical Publications of the Fishery Research Committee), no. 4, 1965, 409 pp., illus., printed in Spanish. Direccion General de Pesca Maritima, Subsecretaria de la Marina Mercante, Ministerio de Comercio, Madrid, Spain. Contains, among others, these articles: "Las merluzas Atlanticas" (The Atlantic hakes), by Fernando Lozano Cabo; "La pesqueria de arrastre de Castellón, en ejemplo de sobrepesca" (The trawl fishery of Castellón, an example of overfishing), by Manuel Gomez Larraneta; "Evolución de los rendimientos al finalizar el tercer año del plan experimental de pesca de arrastre" (Development of the effort to finalize the third year of the experimental trawl fishing plan), by P. Suau; "Evolucion de los costos y beneficios de la flota de arrastre de San Carlos de la Rápita, perteneciente al plan experimental de pesca de arrastre en 1963" (Change in the costs and profits of the trawler fleet of San Carlos de la Rapita pertaining to the experimental trawl fishing plan in 1963), by Luis Millan Roca; "Nuevos pesqueros que entran en servicio" (New fishing vessels which went into service); "La campaña del Walther Herwig en aguas de Africa occidental" (The cruise of the Walther Herwig in West African waters), by Miguel Massuti; "Sobre las fluctuaciones de la produccion de atunes de las almadrabas sudatlánticas" (On the fluctuations in tuna production in the South Atlantic tuna fisheries), by Julio Rodriguez-Roda; "Las algas de interes industrial de la costa de Cadiz" (The seaweeds of commercial interest on the Cadiz coast), by Juan Seoane Cambra; "Campaña a bordo de un bacaladero" (Cruise on board a cod fishing vessel), by Orestes Cendredo; "Perspectivas de la majora de la

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pesca de arrastre de Valencia" (Prospects of improvement in the trawl fishery of Valencia), by J. M. San Feliu; "Estudios sobre la pesca de arrastre en la Provincia de Tarragona" (Studies on the trawl fishery in the Province of Tarragona), by F. Vives Galmes; and "Evolucion de la produccion pesquera Española" (Changes in the Spanish fishery production), by Antonio Franco and Julian Sanchez-Ramos. Also includes articles on: "Estudios de la gamba rosada o carabinero (Aristeus antennatus)" (Studies on the red shrimp--Aristeus antennatus), by C. Bas; "Plan de estudios sobre la pesca de arrastre en general y la de langostinos y acedias en particular, en la region Sudatlantica Andaluza" (Plan for studies on the trawler fishery in general and that of spiny lobsters and yellow soles in particular, in the South Atlantic area of Andaluz), by F. Lozano Cabo; "Estudio sobre las algas de aprovechamiento industrial de la Provincia de Santandar" (Study on the seaweeds for industrial development in the Province of Santandar), by F. Ramos and O. Cendrero; "Las algas del Noroeste de España" (The seaweeds of Northwest Spain) by J. Seoane; "Programa de recuperacion ostricola en el Bao (Ria de Arosa)" (Program for renewal of oyster culture in El Bao--Arosa Estuary), by B. Andreu; "Plan de estudio de las pesquerias de arrastre de Baleares" (Plan for study of the trawl fisheries of the Balearics), by M. Oliver and M. Massuti; "Plan de trabajos sobre los escombridos Atlanticos-Africanos" (Plan for research on the African Atlantic mackerels), by F. Lozano; "Repoblacion ostricola en el Cantabrico" (Renewal of oyster culture in Cantabria), by J. Cuesta; "Actividades internacionales de la Direccion General de Pesca Maritima" (International activities of the Office of Marine Fisheries), by O. Rodriguez Martin; "La tecnica pesquera del futuro" (The fishery technique of the future), by Trad. J. Barcelo; and "Trabajos tecnicos de la O.E.C.D." (Technical works of the O.E.C.D.).

SPAIN AND NORWAY:
"Aktuelle betraktninger omkring fiskeriene i Spania og Norge" (Current views about fisheries in Spain and Norway), by B. Lövås-Svendsen, Tidsskrift for Hermetikindustri, vol. 51, no. 1, Jan. 1965, pp. 21-22, printed in Norwegian. Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

SPERM OIL:
The following are from Chemical Abstracts, vol. 59, American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Technology of sperm oils," by N. A. Nikonova and V. E. Kulyasova, Dec. 9, 1963, Abstract No. 14227g.

"Treatment of sperm whale oil," by Hisashi Fujii, Mikio Hori, and Takeo Horii, Nov. 11, 1963, Abstract No. 11768e.

"Treatment of sperm whale oil," by Saburo Yoritachi and Koretsu Wo, Nov. 11, 1963, Abstract No. 11768d.

SPINY LOBSTER:
"Une campagne trop longue, mais des resultats positifs--Telle est la premiere leçon de la campagne du langoustier Rigel, de Douarnenez, au Honduras" (A cruise too long but with practical results--such is the primary conclusion of the cruise of the spiny lobster vessel Rigel from Douarnenez to Honduras), article, La Peche Maritime, vol. 44, no. 1043, Feb. 1965, pp. 77-81, 82, illus., printed in French, single copy 14 F (about US$2.85). La Peche Maritime, 190, Blvd. Haussmann, Paris, France.

"La langosta" (The spiny lobster), by Lorenzo Marques, article, Iberica, vol. 42, no. 30, Dec. 1964, pp. 394-396, 397, illus., printed in Spanish. Iberica, Palau, 3, Apartado 759, Barcelona-2, Spain.

STURGEON:
From the series: Travaux sur les Pêcheries du Quebec, illus., printed in French, 1964. Bureau des échanges, Station de Biologie Marine, Grande-Rivière, Gaspé-Sud, Quebec, Canada.:

Étude Préliminaire de l'Esturgeon de Lac, ACIPENSER FULVESCENS, dans la Région de l'Abitibi (Preliminary Study of the Lake Sturgeon, Acipenser fulvescens, in the Abitibi Region), by Gerard Deaulieu and Etienne Corbeil, No. 4, 8 pp.

Validite d'une Distinction Specifique entre les Deux Acipenserides: Acipenser Sturio L. d'Europe et Acipenser OXYRHYNCHUS d'Amerique du Nord (Validity of a Specific Distinction Between the Two Acipenseridae: Acipenser sturio L. of Europe and Acipenser oxyrhynchus of North America), by Etienne Magnin, No. 1, 20 pp.

SWEDEN:
"Det Svenska havsfisket okade under ar 1964" (The Swedish marine fisheries increase during the year 1964), article, Svenska Västkustfiskaren, vol. 35, no. 4, Feb. 25, 1965, pp. 76-77, illus., printed in Swedish, single copy 10 kr. (about US$1.95). Svenska Vastkustfiskarnas Centralforbund, Ekonomiutskottet Postbox 1014, Goteborg 4, Sweden.

TRADE LISTS:
The U. S. Department of Commerce has published the following mimeographed trade list. Copies may be obtained by firms in the United States from the Commercial Intelligence Division, Office of International Trade Promotion, Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230, or from Department of Commerce field offices at $1 each.:

Canneries and Frozen Foods--Producers and Exporters--Greece, 12 pp., Feb. 1965. Lists the names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm. Also contains trade and industry data (including fishery products) on production, exports, imports and import control of canned and frozen foods.

TRAWLING:
Preliminary Bibliography on Trawlers and Trawling with Particular Reference to Tropical Waters, compiled by A. Soulier, Occasional Paper 64/4 (Addendum 1), 8 pp., processed, Jan. 1965. Indo-Pacific Fisheries Council, Regional Office for Asia and the Far East, Food and Agriculture Organization of the United Nations, Bangkok, Thailand.

TUNA:
"Purse seine for tuna fishing," by V. S. Dolbish, article, Trudy Dalrybvtus, vol. 3, 1963, pp. 41-52, printed

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in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.

TUNA AND TUNA-LIKE:

Tuntsy i Mecheobraznye Tikhogo i Indiiskogo Okeanov (Tunas and Billfishes of the Pacific and Indian Oceans), by V. G. Osipov, I. V. Kizevetter, and A. V. Zhuravlev. 74 pp., illus., printed in Russian, 1964, 23 Kop. (about 25 U. S. cents). Pishchevaia Promyshlennost', Moscow, U.S.S.R. The first chapter is devoted to a review of the biology of tuna and billfish. A section on the tuna fishery covers reconnaissance; features of the fishery--bait, purse-seine, and long-line fisheries; characteristics of foreign vessels--tuna motherships with catcher boats; fishing gear; and machinery and equipment. The final section includes information on processing technology for tuna, and other aspects of the tuna fishery--tuna, billfish, yellowtail (amberjack), barracuda, bonito, mackerel, dolphin fish, sharks and rays, processing of the catch aboard vessels, and canning of tuna. Most of the sections are based on older literature. Even though this book was published in April 1964, in general it draws on much older publications and data than one would expect from the date of publication. Although the authors draw on information from non-Russian literature, some information on the Russian tuna fishery is included. The book appears to be concentrating on long-lining for tuna, which most likely reflects the fact that the U.S.S.R. seems to be especially interested in that type of fishery. The Kaliningrad-type line hauler mentioned in the book could be of interest to gear technologists. The section dealing with processing technology is perhaps most noteworthy. It contains many data on the various tuna and other fish which were obtained by the investigators of TINRO (Pacific Scientific Research Institute of Marine Fishery and Oceanography). The section contains, among other items, information on: (1) weight-length relationship; (2) relation of the various parts of the body to the total weight; (3) data on the content of moisture, oil, protein, and ash for various fish and various body parts; (4) amino acid composition; (5) physical-chemical properties of the oil; (6) vitamins; and (7) mineral components.

--W. L. Klawe, Inter-American Tropical Tuna Commission

TURKEY:

Balik ve Balikcilik (Fish and Fishery), vol. 13, no. 2, Feb. 1965, 32 pp., printed in Turkish. Et ve Balik Kurumu G. M., Balikcilik Mudurlugu, Besiktas, Istanbul, Turkey. Includes, among others, "The role of fish in animal feeding and nutritional contributions of fish products. Part II," by Macide Akgunes; "Technological developments in the field of fish flour. Part III," by Hikmet Akgunes; and "General Fisheries Council for the Mediterranean. Part I," by Sadan Barlas.

UNITED KINGDOM:

The following Command Papers of the British Parliament, Session 1964-65, are available from the British Information Services, 845 Third Ave., New York, N. Y. 10022.:

Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Kingdom of Norway for the Continuance of Fishing by Norwegian Vessels within the Fishery Limits of the United Kingdom of Great Britain and Northern Ireland, London, Sept. 28, 1964, (with Exchanges of Notes), (Ratifications Have Not Been Exchanged), Norway No. 2 (1964), Cmnd. 2505, printed, 1s. (20 U. S. cents when ordered in the United States).

Exchange of Notes between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Polish People's Republic regarding the Rights to be Accorded to Polish Vessels within the British Fishery Limits to be Established on Sept. 30, 1964, Warsaw, Sept. 26, 1964 (The Agreement entered into force on Sept. 30, 1964), Treaty Series No. 64 (1964), Cmnd. 2507, printed, 1s. (20 U. S. cents when ordered in the United States).

Exchange of Notes between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Union of Soviet Socialist Republics on Matters Arising from the Establishment by the United Kingdom of the Fishery Regime Provided for by the Fishery Limits Act, 1964, Moscow, Sept. 30, 1964 (The Agreement entered into force on Sept. 30, 1964, Treaty Series No. 63 (1964), Cmnd. 2506, printed, 1s. (20 U. S. cents when ordered in the United States).

Protocol of Provisional Application of the Fisheries Convention and Two Agreements as to Transitional Rights Open for Signature at London from March 9-April 10, 1964, London, March 9, 1964 (The Protocol and Agreements entered into force on March 9-April 10, 1964), Treaty Series No. 60 (1964), Cmnd. 2495, printed, 1s. 3d. (30 U. S. cents when ordered in the United States).

U.S.S.R.:

Sovetskie Rybokhoziaistvennye Issledovaniia v Moriiakh Evropeiskogo Severa (Soviet Fisheries Investigations in North European Seas), 468 pp., illus., printed in Russian with English summaries, 1960. Veseoiuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziastva i Okeanografii, Moscow, U.S.S.R. Contains, among others, these articles: "Some results of oceanographic investigations in the Norwegian and Greenland Seas," by A. P. Alekseev and B. V. Istoshin; "Oceanographic characteristics of the North Greenland Sea," by A. F. Laktionov, V. A. Shamontyev, and A. V. Yanes; "On the effect of some oceanographic characteristics on herring migration in the Norwegian Sea," by S. I. Potaichuk; "Changes in the Barents Sea bottom fauna under the influence of fluctuations in the hydrological regime," by K. N. Nesis; "Zooplankton of the frontal zone in the North Atlantic in the spring of 1958," by A. P. Kusmorskaya; "Main regularities in the plankton development in the Norwegian and Greenland Seas," by E. A. Pavshtiks; "The distribution of plankton along the 30° W. meridian in the Atlantic, April-May 1959," by I. P. Kanaeva; "Biological peculiarities in some groups of the Barents Sea cod," by E. M. Mankevich; "The results of young cod and haddock surveys in the Barents Sea in the period 1946-1959," by A. S. Baranenkova; "Main stages in the Soviet studies of the redfish in the North Atlantic," by V. A. Borodatov and V. I. Travin; "A note on local redfish stocks in the Newfoundland and Labrador areas," by K. P. Ya-

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nulov; "The distribution and migrations of immature and young mature Atlanto-Scandian herring," by S. S. Fedorov; "Peculiarities in distribution, growth and maturation of some herring year-classes in the Barents Sea," by I. V. Shutova-Korzh; "Distribution of herring of the Atlanto-Scandian stock," by I. G. Fridland; "On methods of scouting for herring in the Northern Seas," by A. A. Baral; "On estimation of the Atlanto-Scandian herring stock," by Ju. Ju. Marty, S. S. Fedorov, and I. G. Yudanov; "Fisheries investigations in the Middle Atlantic," by A. N. Probatov, E. S. Prosvirov, and O. G. Ryabikov; "On the stocks of main food fishes in the Southern and Southeastern Baltic Sea," by N. P. Birukov, G. I. Tokareva, and A. V. Seletskaya; "Fishery investigations in the White Sea," by N. A. Dmitriev; "Some results of investigations on biology of salmon (Salmo salar L.) of the Kola Peninsula Rivers," by V. V. Azbelev and I. I. Lagunov; "Main peculiarities in the annual life cycle of the White Sea population of Greenland seals," by S. V. Dorofeev; "Observations on fish behaviour by means of underwater technique in the Barents Sea," by O. N. Kiselev; and "The use of submarines for fishery research," by V. P. Zaitsev and D. V. Radakov.

"URSS--transformation et commercialisation du poisson" (U.S.S.R.--Processing and commercial development of fish), by Carlo Lozzi, article, France Peche, no. 91, Jan. 1965, pp. 39-40, 49, illus., printed in French, single copy 2.50 F (about 50 U. S. cents). France Peche, Boite Postale 179, Lorient, France.

The following articles are from Trudy Dalrybvtus, vol. 3, 1963, printed in Russian. Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.:

"The fishing industry of Kamchatka," by V. S. Gorelik, article, pp. 5-17.

"Increase in the transport capacity of the East refrigerated fishing fleet (Vostokrybkholodflot)," by Sh. G. Nadiboidze, pp. 18-28.

WHALE MEAT:
"Determination of the quality of whale meat," by L. P. Shmelkova and N. A. Nikonova, article, Trudy Dalrybvtus, vol. 3, 1963, pp. 173-176, printed in Russian, Dal'nevostochnogo Tekhnicheskogo Instituta Rybnoi Promyshlennosti i Khozyaistva, Vladivostok, U.S.S.R.

WHALING:
"The Antarctic baleen whale stocks," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 54, no. 1, Jan. 1965, pp. 1-3, printed. Hvalfangerforeningen, Sandefjord, Norway.

WHITING:
Extension d'Aire du Merlu, MERLUCCIUS BILINEARIS (Mitchill) en Amérique du Nord (Extension of the area for whiting, Merluccius bilinearis Mitchill, in North America), by Gerard Beaulieu and Etienne Corbeil, Travaux sur les Pêcheries du Québec No. 5, 7 pp., illus., printed, 1964. Bureau des échanges, Station de Biologie Marine, Grande-Rivière, Gaspé-Sud, Quebec, Canada.

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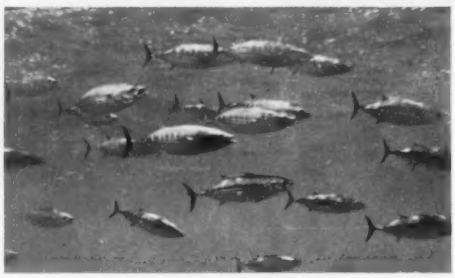
HIGHLIGHTS IN THIS ISSUE (JUNE 1965)

The Frontier of the Sea



Underwater photo of skipjack tuna.

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